Products finishing

FRED W. VOGEL, Editor
(On leave of absence in the U. S. Armed Forces)

Volume 7 April, 1943 Number 7

Published monthly by GARDNER PUBLICATIONS, Inc. 431 Main St., Cincinnati, Ohio

•

DON G. GARDNER
President and General Manager

JESSE R. HARLAN
Production Manager

BRYANT W. POCOCK
JEFFREY R. STEWART
Consulting Editors

C. B. F. YOUNG
Contributing Editor

•

JOHN M. KRINGS
Advertising Manager

RICHARD S. KLINE
431 Main St., Cincinnati
MAin 0182

G. M. FILLMORE
342 Madison Ave., New York
Murray Hill 6-3899

GEORGE H. MEYERS
Tribune Tower, Chicago
Superior 2290

FRANK J. ENRIGHT
627 Union Commerce Bldg.
Cleveland
Main 2866

CHARLES H. DEILY, JR.
310 West Durham St.
Philadelphia
Chestnut Hill 1198

Member

CCA

Printed in U. S. A.
Copyright 1943 by Gardner Publications, Inc.

CONTENTS

Editorial 17
By Bryant W. Pocock

Color—What Number Do You Want 20
By A. G. Mezerik

The History of Electroplating 28
By Bryant W. Pocock

Wrinkle Finishes—What You Should Know, Part 2 36
By Jeffrey R. Stewart

Precautionary Measures to "Finish Off" Electroplating Hazards 48
By Clark Bridges

Finishing Facts

Armor-Vit—A New Finish for Metal 56

Special Process for Removing Phenolic Lacquers 58

New Methods Reduce Blackout Hazards 60

New Mixing Formulas for Lead Paints 60

News of the Industry 64

New Plant Equipment and Materials 70

Catalog Library 78

Index to Advertisements 80

More Than 16,000 Circulation This Issue

CONTROLLED-ETCHING OF ALUMINUM WITH *Cowles* PC CLEANER

A manufacturer of aircraft wants a clean surface, slightly etched, but still wishes to hold close to the low tolerances that he is allowed.

A radio control panel manufacturer wants a deep scratch eliminated by etching but it must not pit the large surfaces.

Both Plants use Cowles PC Cleaner—the etchant you can control by a simple regard for Time—Temperature and Concentration.

Ten seconds will etch—Two hours will not "pit."

THE COWLES DETERGENT CO.

7016 EUCLID AVENUE ★ CLEVELAND, OHIO

WAR AND THE METAL FINISHER

"And ye shall hear of wars and rumours of wars: see that ye be not troubled: for all these things must come to pass, but the end is not yet." Matthew 24:6.

From the very first, America has been a land of builders. We have built homes, cities, highways, dams and skyscrapers. We have built automobiles, ships and airplanes. We can and are building tanks, submarines and guns. We shall probably some day build space-ships. As Americans, we have never been static, we have never been satisfied, and we have been happy only when busy.

Today and for the next few years we are confronted with a tremendous conflict which we and our allies must and will win. In order to do so every profession, every business and every enterprise is being forced to go streamline, to become ultra-modern, and to operate much more efficiently than was heretofore considered possible. The great Yankee heritage of The Builders is beginning to manifest itself with renewed vigor.

In the finishing of metals this is no less true than in any other series of operations. The strength and the will to win this war have brought us many permanent blessings. Among these may be listed the almost revolutionarry changes occurring right now in the science of depositing metals by electric current.

Not long ago the plater and his consuming public alike were well pleased with coatings of copper or nickel or silver which used up vast quantities of metal and current and endured for relatively short periods. Today there are government specifications covering types of plating solutions, thicknesses of deposits, and the qualities of deposits as measured by the salt spray cabinet, adhesion tests, and so on. Today the government forces the plater to economize by making him check waste and subject all phases of his work to scientific control; therefore, the government actually assists him to operate efficiently. The government now requires all plating departments to operate in conjunction with approved laboratories. Government technicians and agencies help the plater overcome practically all difficulties.

Advances have been made in the techniques of electroplating which would astound the plater of a few years ago. The mechanical polishing and buffing of a copper coat formerly removed as much as 30 per cent of the deposited material; now a bright acid copper plate developed by Phillips of General Motors requires

only a wiping operation to bring out a high luster. DuPont's high-speed copper plating technique by increasing the cathode efficiency and by raising the current density range for good plating allows the plater to deposit copper two to three times as rapidly as was possible with the regulation cyanide bath.

New types of bright nickel, some of which are trade secrets for the moment, allow much higher quality deposits of this metal. Alloy plating has a thousand applications. Addition agents used in the deposition of chromium now increase the throwing power of chromium baths from 10 to 50 per cent of their former values.

By the hundreds, plating departments are discarding old equipment and purchasing new. Modern rectifiers, better tanks, more suitable racks and automatic driving mechanisms are rapidly replacing equipment now considered obsolete New and better equipped laboratories are sprouting up all over the land, whose functions include rigid control of plating solution concentration, pH, temperature, and so on, and the measurement of plating quality. The laboratories themselves have acquired instruments and procedures unsurpassed in the capacity for getting accurate results quickly.

All things considered, the war is bringing out the best in all of us. We are forgetting selfishness and the limited horizons of personal gain. We are adopting the broader outlook for eradicating the common enemy by the installation and utilization of powerful weapons. The metal finisher is no exception.

Bryant W. Pocock

METAL CLEANING "KNOW-HOW"

"For cleaning zinc-base die cast materials before plating, we use Metso 66*. With previous compound, due to considerable etching of metal, we had to cut cleaning time to a point where grease removal was insufficient. Now with Metso, parts are chemically clean in 2-3 minutes, with no etching."
MID-WESTERN METAL PLANT
METSO
METSO CLEANERS
SODIUM METASILICATE
SODIUM SESQUISILICATE

*Sodium metasilicate cleaner for removing mineral oils and greases. Its special soluble silica ingredient restrains etching effect on sensitive metals. Ask for more facts. No obligation.

PHILADELPHIA QUARTZ COMPANY

GEN'L OFFICES: IONIC AND THIRD STS., PHILA., PA. • 9 PLANTS • DISTRIBUTORS IN 65 CITIES

STERLING 1000

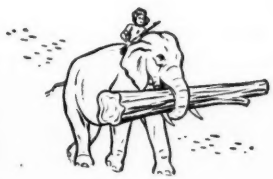
New Electric Portable Sander

POWERFUL YET VIBRATIONLESS!

The NEW "Sterling-1000" Electric Sander packs the kind of power punch you want! All the strength you need for continuous high speed production, yet *controlled* to obtain absolute *vibrationless* operation. The "Sterling-1000" is stout enough to tackle the toughest job — streamlined and balanced for easier handling. An engineering triumph! Won't shake itself into breakdowns — or jingle-jangle the operator's nerves! Women operators prefer operating this new sander!

NEW SANDING ACTION CUTS FASTER — SMOOTHER!

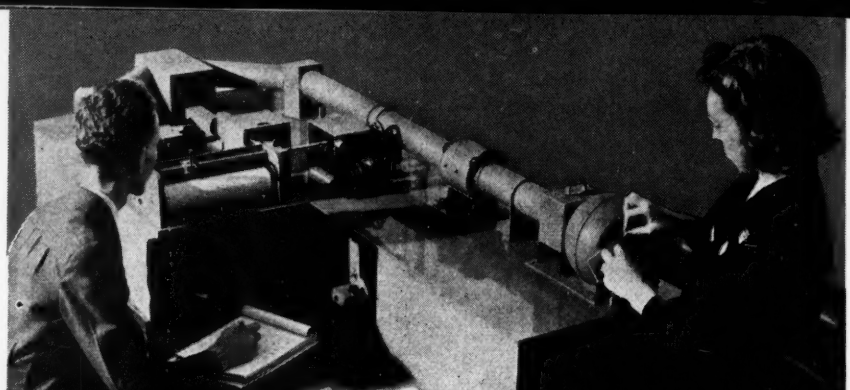
Orbital, circular, thousands of abrasive grains cut furrows which cross and recross each other. With this action, the "Sterling-1000" *cuts faster*—produces the smoothest surface you've ever known on wood, metal, plastic or composition. Ideal for many rubbing and polishing operations.



Write today for a folder describing the New "Sterling-1000"

STERLING TOOL PRODUCTS COMPANY

375 E. Ohio Street • Chicago, Ill.
615 W. Washington Blvd. Los Angeles, Calif.
74 Wellington Street, E. Toronto, Canada



COLOR

—What Number Do You Want

By A. G. MEZERIK

PRODUCTION executives in the metal finishing industry have experienced difficulty for a long time in matching colors and shades for finished parts. There have been arguments as to when a shade has been matched or, worse yet, has not been matched. Variation in the human eye has been one of the causes of this failure. Two persons fail to measure visual color sensations identically, and it is almost an impossibility for any two pairs of eyes to see exactly the same color value in a shade under the same conditions of light. Nearly all of us have more than once wished we could describe color and apply it by blueprint or by some accurate formula.

The war has speeded the development of the cure for this perennial headache for the metal finishing industry and every other user of

color. When color became an important problem to the Army and Navy, something had to happen fast. Camouflage on parts had to match, even when the final article was fitted together from parts subcontracted in many different plants. It is clear that no procurement officer can be satisfied with camouflage coloring which is not exact. An inaccurate shading may mean that the first enemy plane which flies over the snow fields or the tropical jungle where the camouflaged article is in use will spot the badly camouflaged piece and blast it out. Enemy planes are equipped with special filters for just this purpose. And, while camouflage colors point up most dramatically the need of the armed forces for accurate color use, the same necessity exists in the manufacture of tanks, trucks, planes, ships and almost every other machine-made item.

The new military problem, plus the old civilian problem of matching colors and getting true colors, have both found a wartime solution which will be of the greatest value to industry in the days of peace to come. The American Standards Association, the nationally recognized body for the establishment of standards, has approved an American War Standard for the specification and description of color.

This new American Standard provides a common language which makes it possible for a contractor to specify color by data alone and, on this basis, to predict accurate results. More sensationally, a purchaser will be able to telegraph color instructions which will be more exact than directly delivered samples now are. When samples are supplied directly or by mail, the standard will make it possible to calibrate these. The standard provides a uniform method of analysis both for the sample and the final result. The analysis can be applied in any part of the country. Eventually the new standard will lead to the elimination of the present expensive delay incident to the preparation and submission of color samples and of disagreement about whether the colors really match. Translating from one color system to another, as for instance from the Munsell to the Ostwald, will also become easier. Finally, instructions from the contractor to the subcontractor can now be written quickly and with accuracy.

While the standard is not easy to describe in non-technical terms or designed for the layman to use, these are the highlights of its operation. The first step in using the American Standard is to determine the mathematical measurement of a color sample, its wave length and reflection characteristics. This is done by inserting the sample into a device known as a "spectrophotometer," shown in the illustration heading this article. In this instance, the spectrophotometer is being used to measure a sample of yellow paper. The spectrophotometric curve is drawn automatically on the drum at the left.

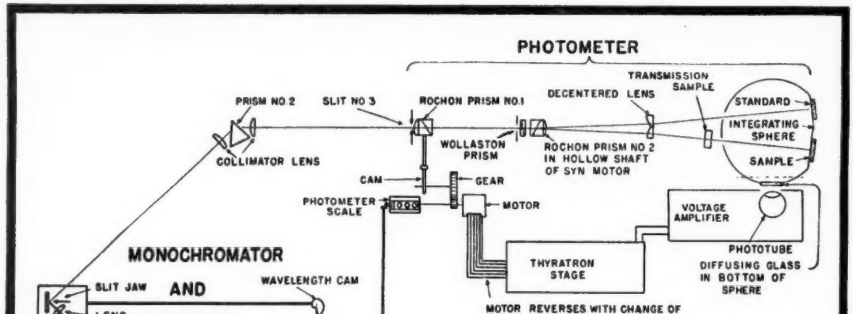
The most modern type of this measuring instrument utilizes an electronic tube and embodies several patented features developed by Dr. Arthur C. Hardy of the Massachusetts Institute of Technology, a leader in the field of color physics. Any color sample can be placed in the spectrophotometer and the values of color recorded automatically on a chart in terms of the percentage of light reflected by the color. Incidentally, spectrophotometers are not new. They have been in use for decades, but it is only recently that they have been so perfected that a reading can be made in two or three minutes instead of after a slow and laborious process. A schematic diagram of a G-E recording photoelectric spectrophotometer is shown on page 22.

The second step in the use of the standard is the reduction of the mathematical reading to a color group on

the spectrum. The color mixing system developed in 1931 by The International Commission on Illumination is designated for this purpose. Through this method the mathematical values discovered by the spectrophotometer are brought back into the visual field.

The third and last phase in the use of the standard is the location and visualization of the color exactly as indicated mathematically by the spectrophotometric reading. The second step finds the general range. For the specific visual determination the Munsell Book of Color, in the 1929 edition, is designated in the American Standard. The Munsell is an integrated system of 400 meticulously prepared color samples, based on the visual relationship of colors. There are several such systems, but up to now only the Munsell has been calibrated in both the terms of the spectrophotometer and of the I.C.I. color mixture system. The calibration will shortly enable persons using the standard to move directly from Step One to Step Three without the intermediate operation.

While the procedure sounds complicated, in actual use the standard simplifies the present method of color specification immeasurably. In achieving this effect, it is no different from other scientific language which describes the working of the involved natural laws by which we determine the degree of heat and cold in our environment. We read a thermometer instantly without conscious recognition of the complex measurements which form the basic rules for temperature measurement. The new American Color Standard can, in this way, be compared to a thermometer. For instance, a contractor may wire his supplier, "Use 5.5 R 4/14 on fender." That's an exact description for a specific red. To see it the supplier or his colorist, wherever he is, can refer to the Munsell Book of Color



Schematic Diagram of G-E Recording Photoelectric Spectrophotometer

and under the number 5.5 R 4/14 see the color and match it.

Several paint companies, among them the Glidden Company and Pratt & Lambert, already utilize the Munsell system of color notation. A color can be ordered from these or other paint companies by number and, after the color has been applied, the finisher or the contractor can check his resulting finish on a nearby spectrophotometer to provide fidelity and subsequent color control. Spectrophotometers are expensive. Wide ownership is not visualized, since only a few in each region will be sufficient for the country's needs. They are already located in convenient centers.

In pointing up the advantages of the spectrophotometer and the standard to the metal finishing industry, the experience of one of America's largest electric appliance manufacturers is interesting. The director of this company's laboratories recently said, "We have a perfect combination for color matching, for color specification and for color research."

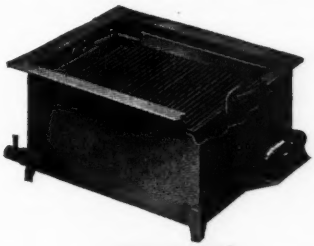
Where precision is not all-important, color names, as defined by the Inter-Society Color Council or the Munsell System, can still be used. The color designer and the art director is still free to use his creative imagination, but with the assurance that at any future time his invention can be matched and maintained by the use of scientific control of production and a common color language. The merchandising manager is not affected at all. He can continue to invent and use color names which are developed for sales promotion. The standard is for technical control by experts charged with the responsibility for better color production and not for the layman.

Use of the techniques embodied in the new American Standard is already conserving paints. General Electric Company had been using 111 different black finishes; now these

METAL PARTS CLEANING
Low Cost -- Efficient

STURDY-BILT "Soaker-Hydro" METAL PARTS CLEANER
Continuous Production

Combines long "soaking - process" plus Hydro washing Action for large production. Parts are loaded onto trays, passed through the "soaking tank"—then are rinsed to remove oil film and clinging chips — then subjected to a power wash. They are removed dry and ready for use or for the next manufacturing operation. Simplicity is the keynote of construction as well as operation. Send for complete details.



"SIMPLEX" METAL PARTS CLEANER

This small, compact, automatic and mechanically simple Unit combines the two most positive methods of cleaning Metal Parts, Assemblies, Shells, Cartridges, Castings, Stampings, etc. A swishing action positively removes all grease, oil, dirt and metal chips that have been loosened during the "chemical action" of the "soak." Can be installed in different departments or in a series—one unit for cleaning, another for rinsing or rust prevention coating and others for special requirements. Send for "Simplex" bulletin for complete details.

Sturdy-Bilt Equipment Corp.
DEPT. P-4 WEST ALLIS, WIS.

have been reduced to four. In the automobile industry, where finish is especially important, a prominent executive has stated that the importance of the application of the standard is widespread.

Three advantages growing out of the use of the standard are already on record. 1. The standard provides a new and important way of simplifying and reducing the number of finishes used. 2. It offers an exact method of determining the precise shade of color that is wanted. 3. It provides color control throughout the process of finishing. Most important, however, is its ability to provide a simple numerical method of color specification.

As one of the auxiliary advantages of the use of the standard, the finisher can get a preview of how a new color which he is using on a metal part will stand up under any set of conditions he wants to simulate with artificial sunshine or weather. His "before" and "after" spectrophotometer results and comparisons with the calibrated color chart will give him this valuable information. This is exactly what the Government is now doing in its job of standardizing the specifications for camouflage colors and determining the characteristics of luminescent materials.

Much of what is written or said about standards of any kind makes them sound technically obscure or as though they were some form of regimentation. Their content is technical, but since they are a set of rules for scientists they should not be read by the inexpert and, far from being regimentation, they free those who use them from confusion and mistakes. The color standard, if widely adopted in the metal finishing industry and used voluntarily, will enable the user to know his colors as accurately as he knows what time it is. To tell time you don't have to explain how time is determined. The standard of time does that and the clock is the device by which we quickly apply the intricate data by which we know how to mark off the time.

Proponents of this standard say that their aim is to make color as easy to write and specify as it is easy to read and write music. No longer, they say, will users of this standard stumble along describing color they saw somewhere, vainly trying to reproduce a color without a specific scientific definition of it. The language and the technique are brought together for a common solution of the problem.

It required a lot of work, knowledge and research to assemble this standard. Probably the final guarantee of its worth is in this partial list of companies who finally approved it:

U. S. Navy Department
U. S. Department of Agriculture
U. S. Bureau of Printing and Engraving
U. S. Pharmacopoeial Convention
Agfa Ansco
American Society for Testing Materials
Association of American Railroads (Signal Section)
Bausch and Lomb Optical Co.
Dow Chemical Company
Eastman Kodak Company
Electrical Testing Laboratories
General Electric Company
The Glidden Company
Illuminating Engineering Society
National Bureau of Standards
National Electrical Manufacturers Association
Office of Production Management
Optical Society of America
RCA Manufacturing Company
Westinghouse Electric and Mfg. Co.

The initial request for the making of the standard came from the Interchemical Corporation and from General Electric Company. The latter's reason for wanting the standard is of vital interest to the metal finishing industry. Here is what they said:

"In days gone by in General Electric when different parts of apparatus were built and finished in different places to be later brought together in one place, the problem of color matching arose. In apparatus manufacture color matching is im-

--But Not a Headache in a Carload

OF A-F METAL PRODUCTS CLEANING MACHINES

For (Airplane Engine Manufacturer's Name Censored)

HERE are 8 more A-F Metal Products Cleaning Machines which will soon be speed-cleaning airplane engine gears, wrist pins, connecting rods, valves and other small metal products.

PRECISION engineered, sturdy, trouble-free as is all A-F Cleaning and Finishing Equipment, these machines are built to outlast the war by many years.

IF YOU are producing war materials, write today for our newest illustrated folder depicting various types of A-F Cleaning and Finishing Equipment for war-time and post-war production.

The Alvey-Ferguson Co., 626 Disney St., Cincinnati, Ohio

CONVEYING EQUIPMENT

CONVEYING A-F MACHINERY **Alvey-Ferguson**

METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

portant, but when we began to manufacture appliances for the home, color matching was imperative, for then our products were scrutinized by the detecting eye of Mrs. John Q. Public, and they had to be right.

"Now we can order a color by a recognized specification and know it will be right. This is needed by industry in its purchases of new materials and supplies. The standard should also reduce present unnecessary differences in the color demands of industrial customers, and aid in the present era of large scale subcontracting."

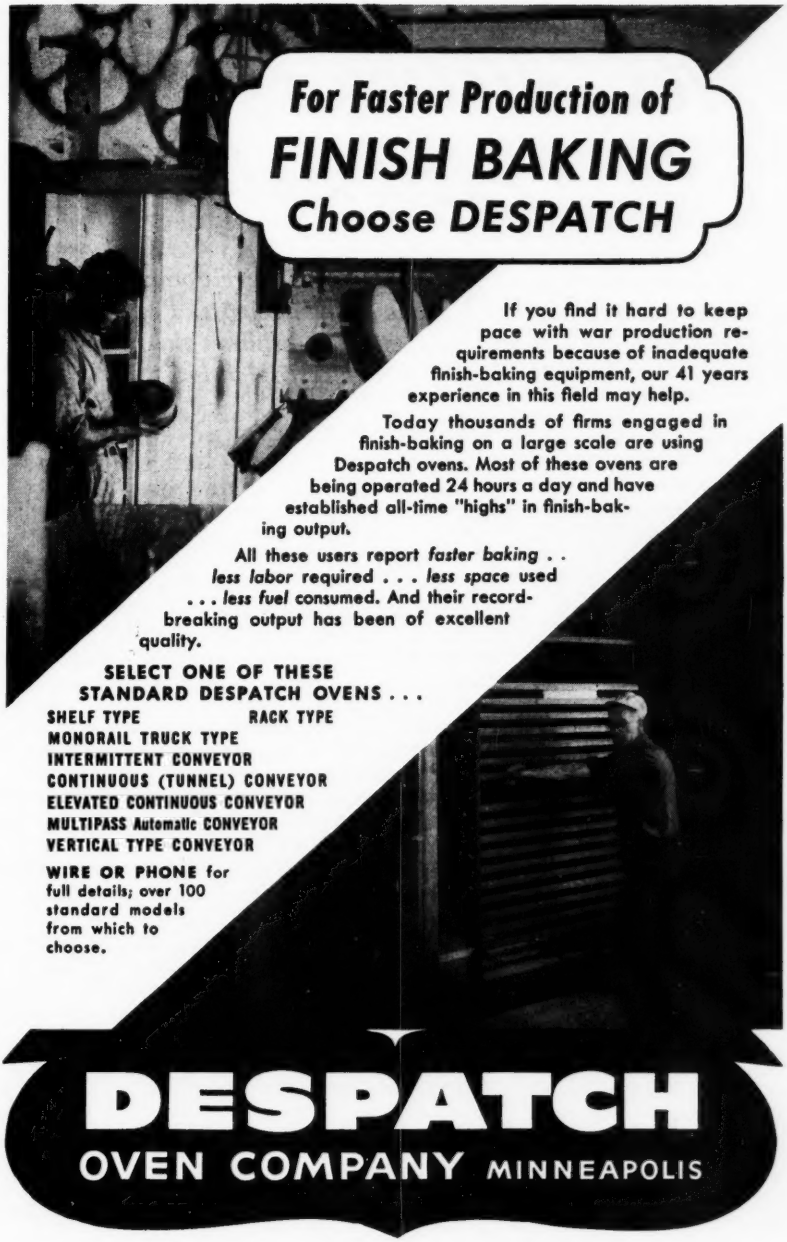
(Illustrations Courtesy General Electric Company)

Laboratory Equipment. A 12-page catalog now being issued by The United States Stoneware Co., Akron, Ohio, illustrates and describes its line of acid-proof laboratory equipment. The corrosion-resistant equipment manufactured by this company includes that made from ceramics, rubber, synthetic rubber-like materials, metals, and their various alloys. Items of laboratory equipment described in this catalog include laboratory sinks, sink stands, sink outlets, table troughs, table tops, acid-proof pipe, acid-proof pipe fittings, acid-proof traps, acid-proof floor drains, diluting sump tanks, cement-asbestos pipe, ventilating equipment, Tygon acid-proof paint, acid-proof floors, and miscellaneous equipment.

Copy of catalog 498 will be sent free upon request.

NALCO DRITHERM
CARBON FILAMENT LAMPS
Best For Infra-Red Ray Drying
Nalco Dritherm Lamps are the carbon filament type...proved for years in therapeutic and industrial practice as providing maximum emanation of infra-red ray within the desirable penetration band. Made only by—
NORTH AMERICAN ELECTRIC LAMP CO.
1020 Tyler Street
St. Louis, Mo.

UNEXCELLED in SPEED and DURABILITY
JETAL
THE ORIGINAL BLACK OXIDE FINISH FOR IRON AND STEEL
Quickly applied . . . by immersion . . . on iron and steel, JETAL's hard, dense black resists abrasion and corrosion. Deep-penetrating, non-reflective, rust-resistant. It will not chip, scale or peel . . . does not change dimensions or surface textures . . . requires no elaborate equipment, or electric current. Substitute for nickel, zinc, cadmium, and tin plating.
Immediate Delivery, Any Quantity
Ask us to help with your protective-coating problems. Consultation service without obligation. Samples JETALized without charge.
JET-OILS FOR INCREASED RUST RESISTANCE
JETALIZED steel treated with our Jet-oils as auxiliary coatings give from 50 to 300 hours' salt spray test.
the JETAL process
Patented
ALROSE CHEMICAL CO.
PROVIDENCE, R. I. • TEL. Williams 3000



For Faster Production of FINISH BAKING Choose DESPATCH

If you find it hard to keep pace with war production requirements because of inadequate finish-baking equipment, our 41 years experience in this field may help.

Today thousands of firms engaged in finish-baking on a large scale are using Despatch ovens. Most of these ovens are being operated 24 hours a day and have established all-time "highs" in finish-baking output.

All these users report *faster baking . . less labor* required . . . *less space* used . . . *less fuel* consumed. And their record-breaking output has been of excellent quality.

SELECT ONE OF THESE STANDARD DESPATCH OVENS . . .

SHELF TYPE **RACK TYPE**
MONORAIL TRUCK TYPE
INTERMITTENT CONVEYOR
CONTINUOUS (TUNNEL) CONVEYOR
ELEVATED CONTINUOUS CONVEYOR
MULTIPASS Automatic CONVEYOR
VERTICAL TYPE CONVEYOR

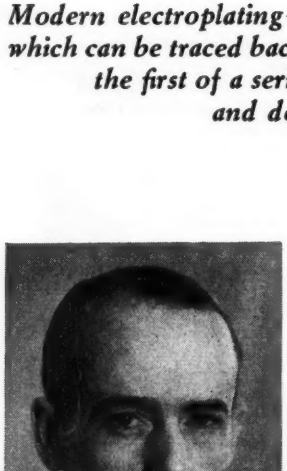
WIRE OR PHONE for full details; over 100 standard models from which to choose.

DESPATCH OVEN COMPANY MINNEAPOLIS

The History of Electroplating

Modern electroplating—a relatively recent development—has roots which can be traced back to the time of the ancients. Presented here is the first of a series of articles which outlines the history and development of electroplating.

By BRYANT W. POCOCK



A recognized authority in the electroplating field, who is at present chief chemist and supervisor of the materials laboratory for a large midwestern war plant, Bryant W. Pocock has recently been added to the editorial staff of PRODUCTS FINISHING in the capacity of consulting editor. Mr. Pocock received his education both in the United States and Europe, and is the author of "The Chemistry Laboratory" and a number of technical articles.

TO say that the science of electroplating began with the original work of Jacobi or dated from the announcements of J. C. Jordan of London would be as conclusive as to state that it originated with the development of cyanide plating solutions or with the substitution of nickel sulfate for the double nickel ammonium salt of Bottger. It actually began much earlier than any of these.

The history of electroplating is in reality a ramification of the separate histories of chemistry and electricity. Whereas chemistry as a science was an outgrowth of the Dark Age hocuspocusses of alchemy, electricity as a science had its beginnings in the fundamental researches of William Gilbert (Gylberde), physician extraordinary to Queen Elizabeth and to James I of England.

We shall first trace the histories of electricity and chemistry from the earliest times up to the point where their juncture and the consequent fusion of their individual concepts made possible the development of electrochemistry and the electrical deposition of metals. After this we shall attempt to bring the story up to the present time. Let us begin arbitrarily with the history of electricity.

Electricity Before Christ

The earliest recorded observations dealing with

electrical manifestations were intermingled with legends of magnetism and the compass needle. The most complete account of the history of electricity in the English language is unquestionably Mottelay's "Bibliographical History of Electricity and Magnetism,"[1] which was employed as a source for much of the following.

The most ancient reference to the compass gives the year 2637 B.C. as the date when the Chinese emperor Hoang-ti in his wisdom built a "chariot" upon which a female caricature stood always facing the south, irrespective of the direction taken by the chariot. Thus it is seen that even in those times the ladies had a hand in directing the affairs of men.

Hoang-ti did not divulge the secret of his feminine direction finder, but it is reasonable to assume that the figure was carved from a piece of loadstone and suspended in such fashion as to preserve freedom of rotation. The lady's nose must therefore have constituted a magnetic south pole. What portion of the figure led Hoang-ti's warriors to the north in search of the rebellious prince, Tchéyeou, is purely a matter of conjecture. It is recorded, however, that the prince was caught and that Hoang-ti lived to the ripe old age of 121.

In the year 1110 B.C. the Chinese Minister of State Tcheou-Koung entertained ambassadors from Youa-tchang. At their departure he presented them with a *tchi-nan,* or "chariot of the south," which must have been an instrument similar to Hoang-ti's.

Magnetic "carriages" are reported again in China about the year 1068 B.C., serving primarily as guides across the plains of Tartary. The frequency with which the direction south is contained in their description would seem to indicate that this direction had an important geographical significance to the Chinese, very probably indicating a way to more temperate climate.

At least two historians, Pineda and Kircher, uncovered evidence to indicate that the subjects of King Solomon of Israel were familiar with the compass about 1000 B.C. and used it in their navigations, showing that by this era others than the Chinese knew of its properties. This is also borne out by Homer, who about the same time relates in his "Odyssey" how the compass was used by the Greeks prior to the siege of Troy.

It was approximately two thousand years after Hoang-ti that Thales of

"The Chinese emperor Hoang-ti in his wisdom built a 'chariot' upon which a female caricature stood always facing the south..."

[1]Mottelay, P. F., "Bibliographical History of Electricity & Magnetism," pp. xx + 673, Charles Griffin & Company Limited, London, 1922.

Miletus, Ionia, observed (about 580 B.C.) that chafed amber will attract light straws and dried leaves. He was apparently the first to discover this property of amber, but he ascribed the phenomenon to the same causes as those of magnetic attraction.

"The Etruscan priests were busily engaged in shooting metallic arrows into storm clouds . . ."

At the time of Thales the Etruscan priests were busily engaged in shooting metallic arrows into storm clouds to attract lightning in order that they might study it. That they succeeded in their endeavors is shown by the fact that these priests became authorities on lightning. Their knowledge was passed on to a few others held "worthy" of the honor and it was early shown how to protect buildings from the ravages of electrical storms. It is probable that the reason why King Solomon's Temple was not struck by lightning for over a thousand years is to be found in the intricate system of lightning by-passers incorporated in its design:

"And the greater house he cieled with fir tree, which he overlaid with fine gold, and he set thereon palm trees and chains." II Chronicles 3, 5.

"He overlaid also the house, the beams, the posts, and the walls therefore, and the doors thereof, with gold . . ." II Chronicles 3, 7.

Belief in the divine origin of lightning is illustrated by scattered references to its manifestation in the Old Testament:

"And it came to pass on the third day in the morning, that there thunders and lightnings, and a thick cloud upon the mount, and the voice of the trumpet exceeding loud; so that all the people that was in the camp trembled." Exodus 19, 16.

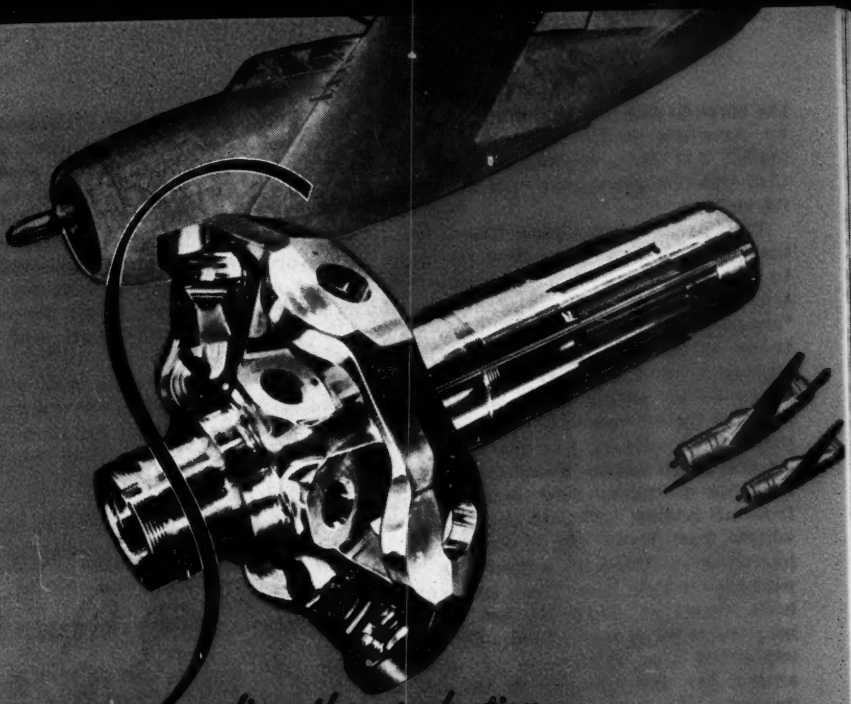
"The Lord thundered from heaven, and the most High uttered his voice.

"And he sent out arrows, and scattered them; lightning, and discomfited them." II Samuel 22: 14-15.

"When he made a decree for the rain, and a way for the lightning of the thunder." Job 28, 26.

"Who hath divided a watercourse for the overflowing of waters, or a way for the lightning of thunder." Job. 38, 25.

The first recorded description of



Speeding the production of a famous aircraft engine

WITH PENNSALT CLEANER

A leading automobile manufacturer now making Pratt & Whitney aircraft engines had done a remarkable job of mechanical production . . . and was interested in stepping up the efficiency of the metal cleaning (chemical) operations.

A wide variety of steel and brass engine parts—including the polished steel propeller shaft illustrated—had to be cleaned of mineral cutting oil, black emery, or tallow polishing compound, prior to tin or cadmium plating . . . All work went through a solvent degreasing operation. Electro-cleaning, with two kinds of cleaners, was carried on in two crane operated tanks, with both direct and reverse current. But even with this cycle, cleaning of polishing compound was not complete.

A Penn Salt technical representative was able to do a real job of improving this method. He eliminated the solvent degreaser—and with the same Pennsalt Cleaner in each tank, he used it as both a soak-cleaner and electro-cleaner.

The resulting work was excellent. There were no rejects. The finish was judged to be the brightest ever obtained. Moreover, everybody in the plating room welcomed the elimination of the costly solvent degreasing operation.

What's *your* metal cleaning problem? Whatever the kind of metal or the type of material to be removed, you can benefit by the experienced advice of a Penn Salt technician. Let him tell you what the family of Pennsalt Cleaners is doing throughout industry today to save time, materials and labor. If you prefer, write fully to our Pennsalt Cleaner Division, Dept. PF.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals

1000 WIDENER BUILDING, PHILADELPHIA, PA.

New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma

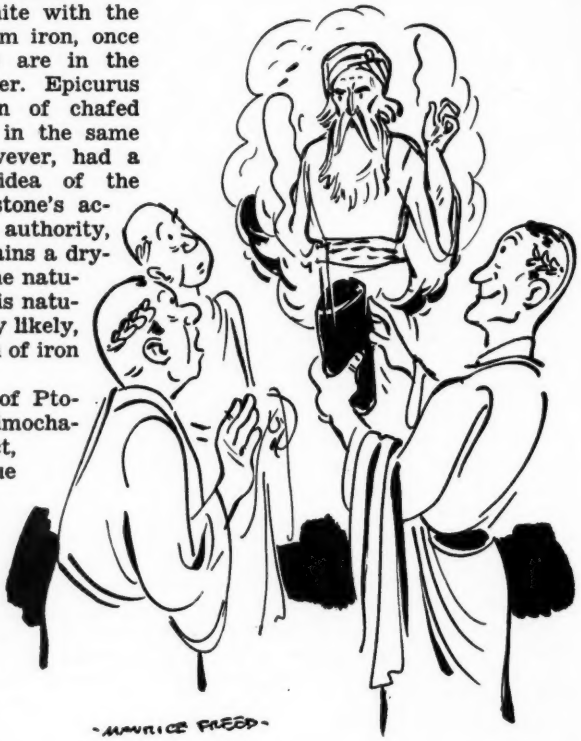
the torpedo fish was undoubtedly made by Aristotle in his "History of Animals," 341 B.C., in which he states that this fish produces a "torpor" upon its victims.

The Greek philosopher Theophrastus in 321 B.C. was the first recorded to have observed that lyncurium, or tourmaline, exhibits attractive or "magnetic" properties similar to those of amber. A few years later Epicurus, who founded a school devoted to an extremely sane view of life and its attendant phenomena, explained the operation of the loadstone by the bland assumptions that small, invisible particles flow continuously from all bodies, and that the particles which flow from the loadstone are particularly fitted to unite with the particles which flow from iron, once both types of particles are in the neighborhood of each other. Epicurus explained the attraction of chafed amber for dried leaves in the same manner. Diogenes, however, had a more straightforward idea of the mechanism of the loadstone's action. According to this authority, the magnetic stone contains a dryness which feeds upon the natural humidity of iron. This natural humidity of iron, very likely, was Diogenes' conception of iron rust.

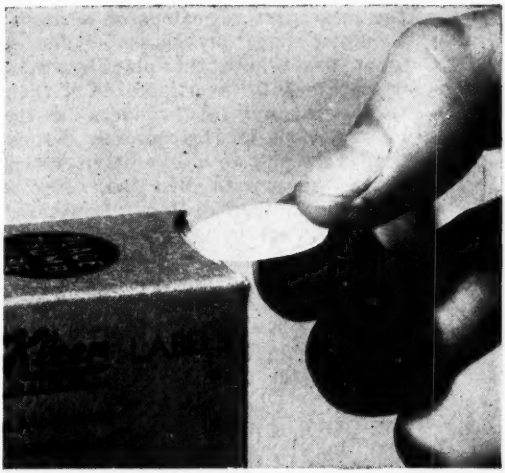
Apparently an order of Ptolemy (285-247 B.C.) to Timocharres, his palace architect, to suspend an iron statue of Arsinoë in the temple of Pharos was successfully carried out by means of several loadstones. No record has been found that the statue ever dropped, which is in itself a monument to the engineering skill of the ancients.

Most of the ancients, particularly the Greeks, became convinced that the substance amber contained a spirit or soul, which became active only by rubbing. This very probably is the explanation of Aladdin's Lamp, which although it was not a product of Greek mythology could very easily have originated from the general idea of an amber soul. The amber soul became vested with occult properties akin to those of the gods and goddesses.

Those of the ancients who studied natural phenomena were largely priests of the various religious sects popular at the time. They were for



"Most of the ancients became convinced that the substance amber contained a spirit or soul . . ."



ABOVE: Automatically dispensed—applied in a split second.

Amazing new method of

MASKING SMALL AREAS

Profit, as other war plants have, with this new method of masking small areas. Kum-Kleen Masking Stickers come in exact size and shape you require and a clean sharp masking edge is assured. No need now to cut masks yourself.

Kum-Kleen Masking Stickers hold securely to metal, glass, plastic, and wood surfaces—yet are easily peeled off in one piece leaving an absolutely clean surface. They are pre-cut to any desired shape or size up to 8½" in width.

Write today for complete information and samples. Give size and shape required. Request Bulletin PF4.

Pre-Cut!

KUM-KLEEN MASKING STICKERS
Pre-cut to Any Size or Shape

Press over area to be masked. No moisture required.

Sharp, non-curling edges guard area.

To remove, simply peel off.

REMOVABLE PRE-CUT STICKERS

AVERY

Kum-Kleen

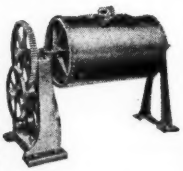
GLOBE
Finishing • Tumbling
BARRELS

The Globe complete line of finishing tumbling barrels has had the acceptance of industry for more than 40 years.

GLOBE DIRECT MOTOR DRIVE, TILTING, TUMBLING BARREL.

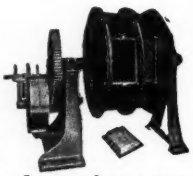
(Right)—Speeds as low as 30 r.p.m. Developed to produce fine finishes on nonferrous parts. No nicks or scratches. Quality built with compactness. Available with wood, steel or cast iron shells.

No. 6 HORIZONTAL FOUNDRY BARREL.



(Right) — Ruggedly constructed for heavy duty work such as removing fins and flanges from castings. Available in varied sizes with tight and loose pulleys or motor drive as shown.

COMPARTMENT BURNISHING BARREL.



(Right) — Performs up to three jobs at once, speeding production. Exceptionally strong and durable. Large door opening facilities loading and unloading. Belt or motor driven.

FREE! Globe's new illustrated catalog P-6 is yours for the asking. Packed full of interesting information, it demonstrates how you can slash your finishing costs. Write today!

THE GLOBE MACHINE & STAMPING CO.
1200-1250 WEST 76TH STREET
CLEVELAND · OHIO

the most part so jealous of what little knowledge they possessed and so wont to obscure the manifestations of nature with the rigmarole of their trade, ascribing all "wonders" to the machinations of their patron deities, that very little was written down. When the priests died their secrets died with them. Park Benjamin[2] makes the astute observation that the properties of amber were not kept secret by the priests because of the fact that "uninitiated" could reasonably be expected to discover those properties for themselves.

It was the Greek word for amber (elektron) which gave us the name electricity.

[2]Benjamin, Park, "The Age of Electricity," pp. viii + 381, Charles Scribner's Sons, New York, 1889.

Please mention PRODUCTS FINISHING when writing to advertisers.

Available Without Priorities

FILTRABLEND-S

•

READY-MADE BASE FOR SOLUBLE OILS

•

PETROLEUM SPECIALTIES, INC.
570 Lexington Avenue
NEW YORK

How to Save

- **TIME**
- **METAL**
- **MONEY**

making STEEL SHELL CASES

If you contemplate the manufacture of steel shell cases, here are two ACP Products that will be of interest to you.

An immersion in ACP's CUPRODINE produces a dense, adherent coating of copper which substantially reduces wear on dies, cuts time over the electrolytic method, saves plating equipment, bus bars and copper electrodes.

ACP also offers—from its war-to-war experience in metal treatment and finishing—RODINE, the inhibitor used in pickling after annealing, which produces a smooth pickled surface and minimizes embrittlement. In severe draws, this latter is of great importance.

•

Other ACP Products that contribute to the war effort are: DEOXIDINE to prepare steel, aluminum and dural for painting; LITHOFORM for coating galvanized iron to hold paint; FLOSOL, an exceptional soldering flux; KEMICK for protecting metal surfaces even when heated red-hot, and other special chemicals vital to the better, cheaper, faster finishing of metals.

Whether or not there is an ACP Product available for your needs, you are invited to bring your problems here for study and recommendations on the proper chemicals and process to help you meet today's requirements. Write today outlining your problems.

AMERICAN CHEMICAL PAINT CO.

MAIN OFFICE AND WORKS
AMBLER . . . PENNA

ACP

CHEMICALS ACP PROCESSES

DETROIT, MICH., 6335 Palmer Ave., E.
CANADIAN BRANCH
WALKERVILLE . . . ONT

Wrinkle Finishes -- What You Should Know

PART 2

By JEFFREY R. STEWART
Analytical and Consulting Chemist

The Gloss of Wrinkle Finishes

THE gloss of a wrinkle finish is a very important factor because the irregularities of the surface aid the eye in seeing the spectacular effect. A wrinkle finish having a high gloss is usually more attractive than one without gloss or with a semi-gloss. This point is illustrated in Fig. 1 which shows the optical effect between a dull, a semi-gloss and a high gloss finish. Note that as the gloss is increased, there is greater effect of thickness or third dimension. As a prominent chemist once told the writer, it gives the impression to the eye that the object is covered with a rich fabric rather than an enamel coating. One thing that the spray mechanic often notices unconsciously is that most of the high gloss wrinkle finishes have large or coarse textures, whereas the flat types have comparatively small wrinkle textures. There are very few exceptions.

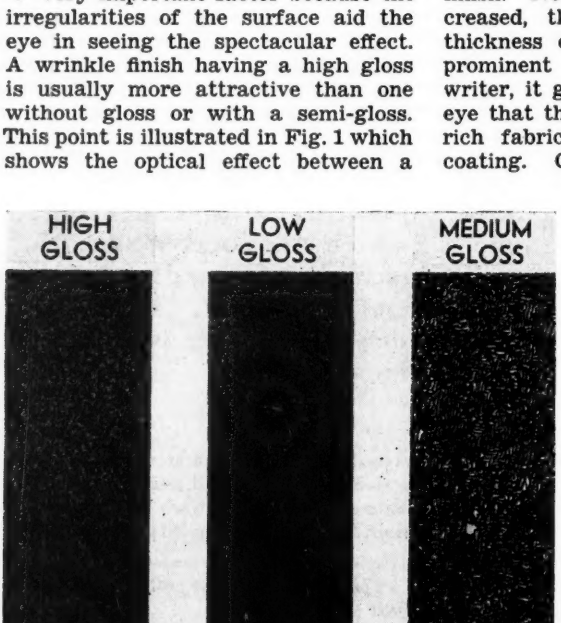


Fig. 1 — The panels shown here consist of three wrinkle finishes with varying degrees of gloss. As the gloss is increased, the size of the wrinkle is also increased. For this example a typical wrinkle finish was selected and the photograph was taken from an actual production spray finish.

Since there is a fairly wide variation in gloss of wrinkle finishes between different manufacturers, and since consumers of these coatings sometimes change their source of supply, it is important to have some control or standardization of gloss. Some organizations control the degree of gloss merely by establishing a reference standard of the desired gloss, and by then comparing the standard reference panel against the sample with the unaided eye, thus it frequently results in disputes due to the natural differences in the eyes of various inspectors or testing engineers.

Another disadvantage of this method lies in the fact that such standard reference panels tend to drift or change slightly in gloss over a period of time, and also change somewhat due to handling and rubbing. They must therefore be rechecked or calibrated every 60 or 90 days. This is usually done by one of the several testing laboratories which maintain a service in establishing and measuring gloss standards from a quantitative standpoint. It is much more satisfactory, however, to have a glossmeter right on the production line—providing that the budget for laboratory expenses will allow it.

It is also desirable to have someone in the organization study the fundamentals of gloss and its practical effect upon the finished product. In most organizations of any considerable size there is usually a person who is keenly observant and to this person should go this rather pleasant or fascinating assignment. Regardless of whether the reader of this article is going to make merely an elementary or an advanced study of gloss, there are certain important things that should be known and agreed upon at the very beginning. The discussion which follows can be applied to the gloss of all types of finishes, in addition to wrinkle finishes.

In the author's work, he has continually encountered three different but related terms. These are "lustre," "gloss" and "sheen." In the metal finishing industry, as in other fields, a considerable amount of confusion is caused when different terms are used

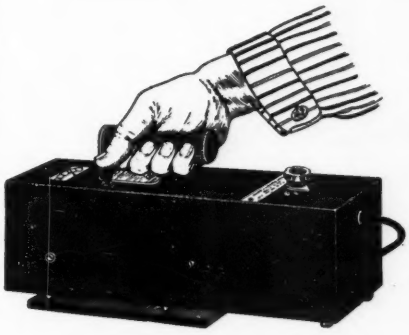


Fig. 2—The gloss of wrinkle finishes can be measured with the A.S.T.M. Glossmeter shown above. This device is also known as the 60-Degree Glossmeter or the Hunter Glossmeter.

to mean the same word. This is especially true if, after studying the matter, we find that the words do not mean what we thought they meant. Gloss, lustre and sheen are words which come under this classification. Gloss is defined in the "National Paint Dictionary" as the "lustre, shininess or reflecting ability of a surface, or the ability of a surface to reflect light regularly." It is based upon the degree of optical smoothness of a surface in which the variations in smoothness are usually microscopic. We can elaborate on this definition by saying that there are four different types of gloss. These are pretty well agreed upon by leading technologists and are as follows:

1. Clarity of image
2. Specular gloss
3. Bloom
4. Subjective gloss

In the paint and varnish industry, we are primarily interested in the

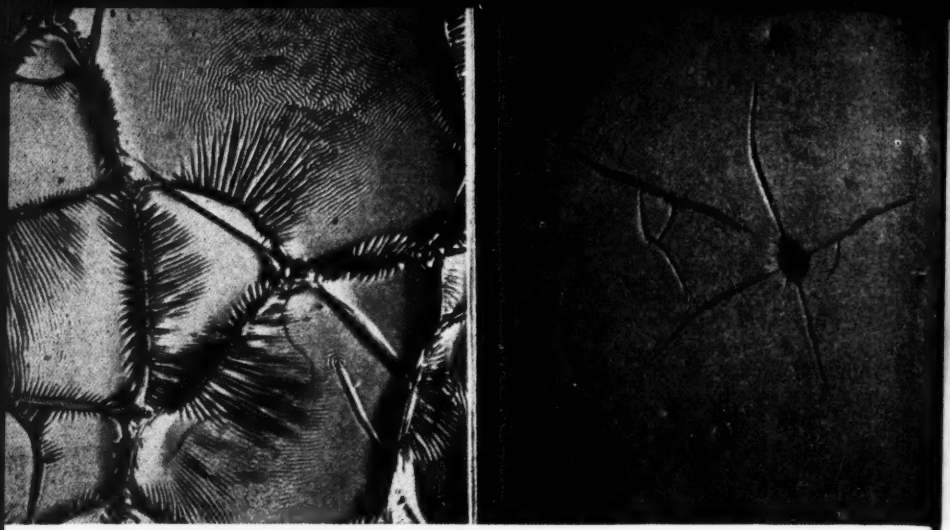


Fig. 3—This illustration shows the influence of a phenolic resin on the wrinkling of a tung oil varnish film. The wrinkling in the left panel is really a defect which is greatly reduced or eliminated by proper processing. The panel at the right shows a "cow's foot" which is really a certain type of wrinkle effect. Photographs courtesy of Dr. William Krumbhaar.

specular type of gloss, since it is the most significant of all of the four types. Specular gloss has the special advantage of being independent of the color of the finish. Specular gloss may be defined as the measure of the quantity of light regularly reflected from a surface at an angle of approximately 25 degrees. In our discussion of the gloss of wrinkle finishes, we will assume that we are dealing with this type of gloss, even though it will not be specifically mentioned each time.

Lustre (also correctly spelled "luster") is merely a general term used to describe the specular reflectance of a surface. It is important for us to remember that the word "lustre" includes both gloss and sheen, the latter two differing only in the angle of measuring. According to Beck*, who has written many specifications for the U. S. Government, lustre is essentially based upon the optical smoothness of a surface, being influenced by even microscopic variation in smoothness.

Sheen is really a special type of lustre inasmuch as it is a measure of the quantity of light specularly reflected from the surface at an angle of approximately 25 degrees. Sheen is usually measured at grazing angles of 5 or 10 degrees.

We should realize the significance of sheen because it helps us to define the lustre of a surface. For instance, a surface can have a high gloss and low sheen, or a low gloss and high sheen. A finish which shows high gloss and low sheen will present a rough or seedy appearance to the eye, although this condition would be less apparent in wrinkle finishes than in other types of protective coatings. As applied to coatings other than wrinkle finishes, therefore, we can say that in high gloss finishes, the sheen is a measure of the smoothness of the film.

Although scientifically speaking we should not use the word "gloss" when discussing wrinkle finishes, it is in general use in the paint industry and is used in this sense by the author.

*Chief Chemist, U.S. Army, Ordnance Depot, Camp Holabird, Baltimore, Maryland.

what to do now?

● It's a fire-fighting axiom that the first 60 seconds of a fire are the most important. If something goes wrong then, you may have a real blaze on your hands.

Alert management, recognizing this, carefully trains its employees to fight fire. It picks key men in the plant, teaches them how different fires behave, how various extinguishers must be handled.

Authorities agree that *demonstrations* provide the best training. So Walter Kidde & Company has prepared a booklet—"How to Teach Fire-Fighting." It tells how to stage a fast-moving, interesting, instructive fire-class. Write for your plant's copy.

Walter Kidde & Company, Inc.
431 West Street **Bloomfield, N. J.**

Fig. 4—The panels reproduced here illustrate the effect of cobalt (top), manganese (center), and lead (bottom) driers on the formation of wrinkles. Photographs courtesy of Dr. William Krumbhaar.

We cannot treat the subject of gloss from a purely fundamental or scientific viewpoint because it is an extremely difficult and complex subject involving higher mathematics and optical physics. This entire subject has been simplified by leading scientific men in the paint and varnish industry merely by treating it from a practical standpoint, rather than by employing the system of involved optics. Take, for instance, the four types of gloss which were previously mentioned. These were not arrived at by reference to fundamental and academic investigations. They were selected as the best way to solve problems of gloss, by a group of men representing a cross-section of the industry at large. Everyone reported and discussed what they knew and observed about gloss and after many conferences, meetings, conventions and compilation of published data, it was mutually decided to adopt their own system which would put all of them on the same basis of understanding. The dictates of outsiders with only theoretical backgrounds had little or nothing to do with the adopted nomenclature. This system, incidentally, has met with almost universal approval and has eliminated many conflicting conditions and disputes.

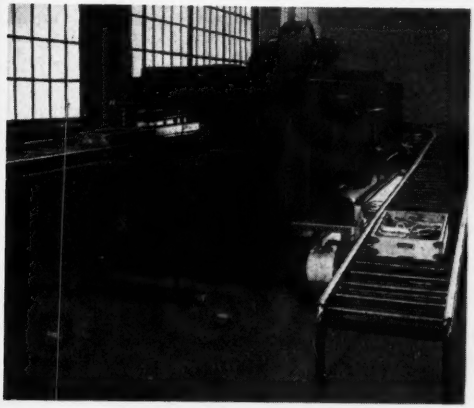
The question now arises regarding a method for measuring the gloss of wrinkle finishes. Since a wrinkle finish is not a smooth surface, the problem is certainly not a simple matter. The best way to make the test is to use as large an area as possible to obtain an average or representative reading. Strictly speaking, you really will not be reading specular gloss, but for all practical purposes, this method must be considered satisfactory until a better one is devised.

One of the most satisfactory instruments on the market is the A.S.T.M. (American Society for Testing Materials) 60-Degree Glossmeter, shown in Fig. 2. This is also commonly known as the Hunter Glossmeter because it was invented by Mr. Richard S. Hunter of the Bureau of Standards in Washington. Mr. Hunter is consid-

ning operation

plete inter-

s cleaning!



COMBINATION CONVEYOR AND DRUM-TYPE WASHING, RINSING AND DRYING MACHINE used by a large manufacturer of fire arms. Sub-assemblies and delicate parts pass through the conveyor section in racks and return to the charging end on a roller conveyor. • Small work, screw machine parts and similar work pass through the drum section and return to the charging end on a canvas belt conveyor.

Only One Operator Needed

to do all the washing required in a large part of the plant.

Only One Set of Pumps and Blower

to handle the cleaning compound, rinse water and drying air for both sections of the machine.

ered one of the outstanding authorities in the United States on the subject of gloss and during the last ten years has contributed some brilliant work and information to our paint and varnish industry.

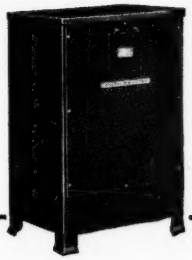
In the event that gloss is to be measured quantitatively rather than by comparison with a reference standard, the Hunter Glossmeter has been found very satisfactory, although some organizations with limited budgets may hesitate before purchasing one on account of the cost which is approximately $100. Anyone who wants to study this matter at greater length can find a great deal of information in the various books dealing with paints and varnishes which go into a discussion of sheen-meters, glarimeters, gloss comparators, photoelectric glossmeters, glossimeters, and reflectometers.

What Causes a Wrinkle Finish to Wrinkle

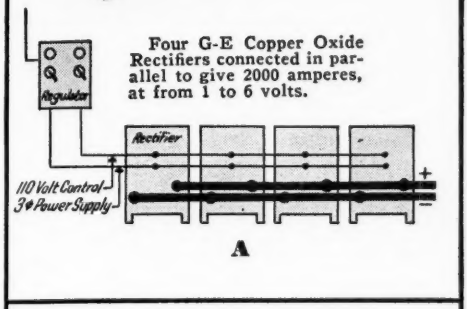
As G. G. Sward once aptly stated, "A wrinkle finish is a very good example of putting a so-called defect to good use." If a coating wrinkles when a smooth finish is desired, the phenomenon is considered a defect. On the other hand, drying to a smooth finish when a wrinkled finish is desired is likewise a defect. Figure 3 illustrates two examples of this point.

The wrinkling of the film is caused by the more rapid expansion of the outer layer of the film. This condition can be caused by the use of Chinawood oil (also known as tung

Fig. 5—The effect of the drier metal upon the wrinkling of a tung oil varnish film is shown in the accompanying illustrations. Cobalt (top) promotes fine wrinkles; manganese (center) and lead (bottom) promote coarses wrinkles. Photographs courtesy of Dr. William Krumbhaar.

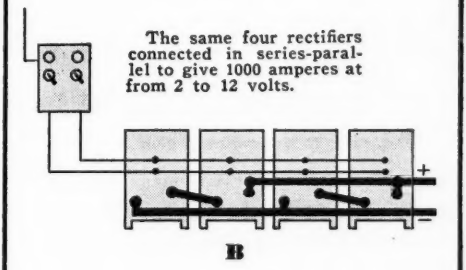


ONE TOOL FOR MANY JOBS



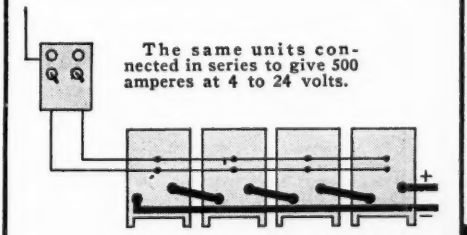
Four G-E Copper Oxide Rectifiers connected in parallel to give 2000 amperes, at from 1 to 6 volts.

A



The same four rectifiers connected in series-parallel to give 1000 amperes at from 2 to 12 volts.

B



The same units connected in series to give 500 amperes at 4 to 24 volts.

C

How one electroplater adapted G-E Copper Oxide Rectifiers for various jobs, including still-tank plating, barrel plating and anodizing

A. 6-VOLT TANK PLATING

By connecting four G-E Copper Oxide Rectifiers in parallel, the plater obtained 2000 amperes at from 1 to 6 volts for a still-tank plating job. One regulator for the units gave complete control over the full range output.

B. 12-VOLT BARREL PLATING

When a barrel-plating contract was obtained, it was a simple matter to re-arrange the four rectifiers in series-parallel so as to secure 1000 amperes at from 2 to 12 volts required for the job.

C. ANODIZING

The same four rectifiers were also re-connected in series for an anodizing job requiring 500 amperes at 4 to 24 volts.

OTHER COMBINATIONS

These are only three common examples of the wide variety of groupings that can be obtained with G-E Copper Oxide Rectifiers to serve specific needs, including 40 volt anodizing.

Why not investigate the potential uses of G-E Copper Oxide Rectifiers in your electroplating? G-E Tungar and Metallic Rectifier engineers will be glad to consult with you. Write to Section A-434-70, Appliance and Merchandise Dept., General Electric Co., Bridgeport, Conn.

GENERAL ELECTRIC

IRCO-IZING PROCESS

A CHEMICAL DIP TREATMENT FOR IRON, STEEL, ZINC AND CADMIUM . . . PROVIDING A RUST INHIBITING BASE FOR PAINT OR . . . A FINAL FINSH

NO MATTER WHAT PART OF THE WORLD WE FIGHT IN IRCO-IZING PROCESS CAN DO ITS JOB TO FIGHT THE AXIS . . .

SAVE STRATEGIC METALS . . .
USE THE IRCO-IZING PROCESS

As strategic metals become scarce, it is vitally necessary to find an adequate substitute that will protect our equipment throughout the world. THE IRCO-IZING PROCESS WILL DO THIS JOB!

The IRCO-IZING PROCESS is very simple . . . only two tanks required—one for the emersion of metal in tank containing our solution (heated to 180 degrees) and another tank to rinse it (also heated to 180 degrees).

By the use of this process many plating problems will be solved and the materials will reach our boys in time, properly protected.

- **EASY TO GET**
- **MEETS GOVERNMENT RUSTPROOF SPECIFICATION**
- **SIMPLE TO SET UP**

Write for Literature—Dept. C.

INTERNATIONAL RUSTPROOF CORP.
12507-15 PLOVER AVE., CLEVELAND, O.

oil) or by the use of certain synthetic resins.

The drier in a wrinkle finish has a substantial effect on the wrinkling action. Some manufacturers of wrinkle finishes supply the drier in a separate container and instruct the spray mechanic to add it just before use. There are several advantages to this method which will be discussed in a later installment of this series. The various types of wrinkle obtained by the use of different kinds of driers, resins and oils are illustrated in Fig. 4 and Fig. 5.

The writer will not go into the involved study of the conditions, causes, and reactions associated with wrinkling actions, since this has already been covered in an authentic publication* to which the reader is referred. Several years ago other terms were used to describe wrinkling, such as "frosting," "matting," "crinkling" and "crystallization." These terms are now rapidly becoming obsolete in favor of the more descriptive term "wrinkling."

*Wrinkle Finishes, by G. G. Sward, Cir. No. 518, N.P.V.&L.A., Scientific Section.

(To be continued next month)

You can't spell
VICTORY
with an absent T.

WE RECOVER YOUR
SOLVENTS and THINNERS
from Sludge, Waste, Wash, Spoiled Lacquers, etc.
AND SAVE YOU MONEY
Each shipment—one drum or a carload—receives PROPER and SEPARATE TREATMENT.
Solvents recovered by the Lofgren Process.
Write to:
SOLVENTS RECOVERY SERVICE, Inc.
1019 BROAD ST. NEWARK, N. J.
or
HAMMOND CHEMICAL SERVICE, Inc.
241 BRUNSWICK ST. HAMMOND, IND.

SARCO CONTROL
is Standard—

for

BULLARD-DUNN PROCESS

The photograph above shows a typical Bullard-Dunn Process unit using a Sarco Thermoton for temperature regulation. The Bullard-Dunn Process removes scale and oxide completely from steel surfaces without etching. It cleans out recesses as well as flat surfaces. These are the reasons it is being used so widely in the manufacture of airplane engines, machine guns, tank transmissions, aircraft bearings, aviation instruments and the like. Sarco is proud to share in this important war work by keeping the Bullard-Dunn baths at their most efficient operating temperatures.

162

SARCO
SAVES STEAM

SARCO COMPANY, INC.
475 Fifth Avenue, New York, N. Y.
Sarco Canada Ltd., Federal Bldg., Toronto, Ont.

Precautionary Measures to "Finish Off" Electroplating Hazards

By CLARK BRIDGES
Industrial Hygienist, National Safety Council

AMERICAN employers and workers are striving to bring victory to America as quickly, as effectively and as completely as possible. Metal finishing, like other branches of industry, is now more important than ever. Efficiency and volume of production offer a challenge to every employer in the field, to every workman in the shop—not only to work hard and long and well, but also to work safely.

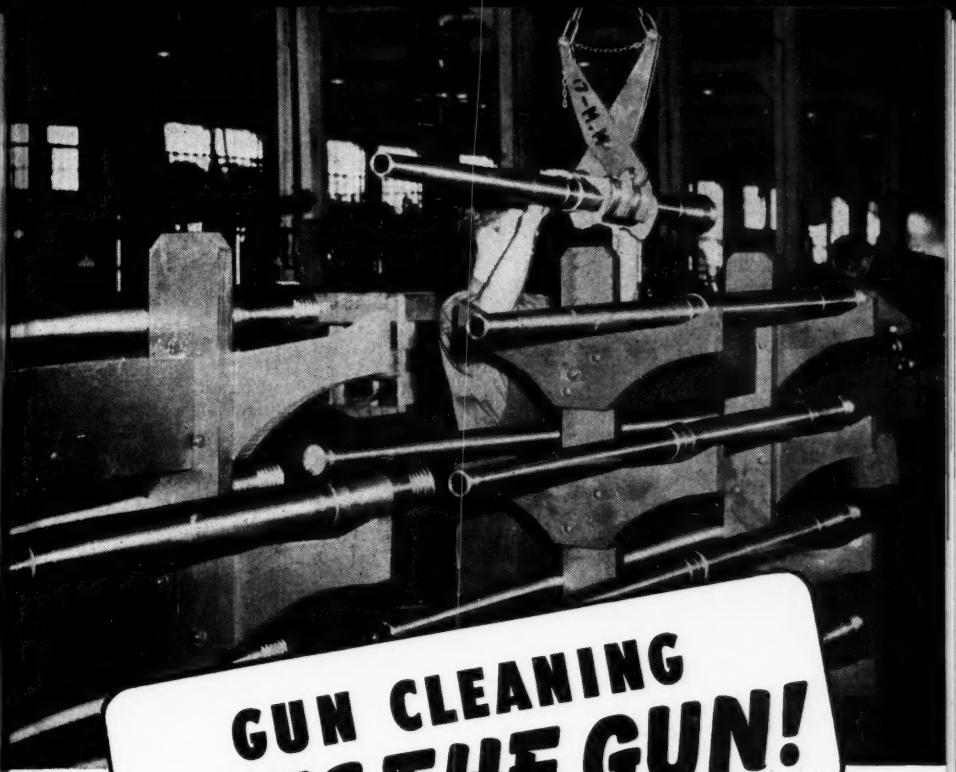
Every man and every machine is needed. Every man-minute and every machine-minute is needed. Every cut finger is a slowdown. Every machine breakdown is a bottleneck. Every accident is a step of retreat from the Japs and Nazis, to say nothing of the tragic consequences, peacetime or wartime, of a serious or fatal accident.

Wartime expansion and accelerated production automatically set up new hurdles for accident prevention. New and sometimes untrained workers, new equipment and new products have increased the hazards.

Records of the National Safety Council show that 18,500 workers were killed on the job in 1942, our first year of the war. In addition, there were a million three quarters non-fatal occupational accidents—too many accidents for a true all-out industrial effort. That's one big reason why President Roosevelt called on the National Safety Council to lead a nationwide offensive against accidents on the home front, to "Save Manpower for Warpower."

A successful industrial safety program, in metal finishing or any other branch of industry, is necessarily a cooperative two-way effort on the part of both management and labor—plus the individual resolution of each man to keep constantly safety-conscious. The plant should provide adequate mechanical safeguards and safety rules. The workman should utilize those safeguards and observe all the rules of the plant; plus the commonsense rule of just being careful.

Electroplating, for instance, may be considered in general a potentially hazardous industry although, actually, it is no more hazardous than most any other industry. It does present an imposing array of sinister-sounding hazards — fire, explosion, vapor poisoning, metal and abrasive dust,



W. I. Photo by Hollem

GUN CLEANING GETS THE GUN!

SUN SPIRITS

provides fast, thorough cleaning for ordnance parts

American ordnance plants are "giving the gun" to gun production . . . to speed the day of victory.

One operation where many plants are saving vital production minutes — with no sacrifice in quality — is metal cleaning with Sun Spirits. They're finding Sun Spirits *fast* . . . thorough . . . economical.

FAST — because it requires no mixing, no heating, is always ready for instant use, quickly dissolves grease and oil film.

THOROUGH — because it penetrates the minute pores of the metal . . . leaves parts sparkling clean . . . helps prevent rusting.

ECONOMICAL — because it's long lasting . . . easily reclaimed.

Metal cleaning in your plant, whatever the product, can profit by the production-speeding advantages of Sun Spirits. For more details write . . .

SUN OIL COMPANY • ***Philadelphia***

SUNOCO

SUN PETROLEUM PRODUCTS *HELPING INDUSTRY HELP AMERICA*

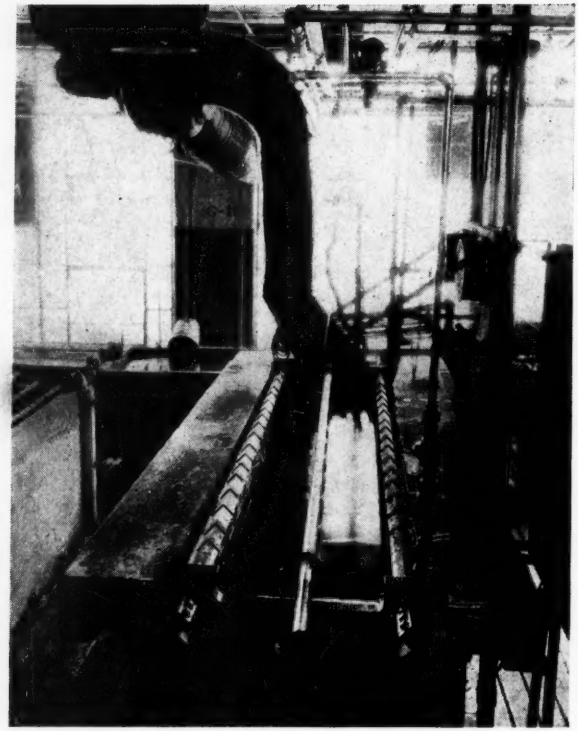


Fig. 1—Complete Ventilating and Exhaust System on a Chromium Plating Tank

acid burns, dermatitis and, in addition, many of the more common hazards, such as falls, cuts and electric shock.

Yet, through a systematic and thorough program of safeguards and a high degree of safety-consciousness among both executives and workers, the electroplating industry can be, in peacetime or wartime, a more productive, more efficient industry, with a minimum of danger to the workers' health and well-being.

The most common hazards of electroplating, in both the cleaning process and the plating itself, are poisoning from fumes and affections of the skin. The latter includes both burns and dermatitis. Dermatitis lesions take the form of ulcerations and fissures in the skin of the hand. Or there may be localized acute dermatitis on any uncovered part of the body. In chromium plating there may be ulceration and perforation of the nasal septum because of the inhalation of chromic acid fumes, as well as "chrome holes" on the hands.

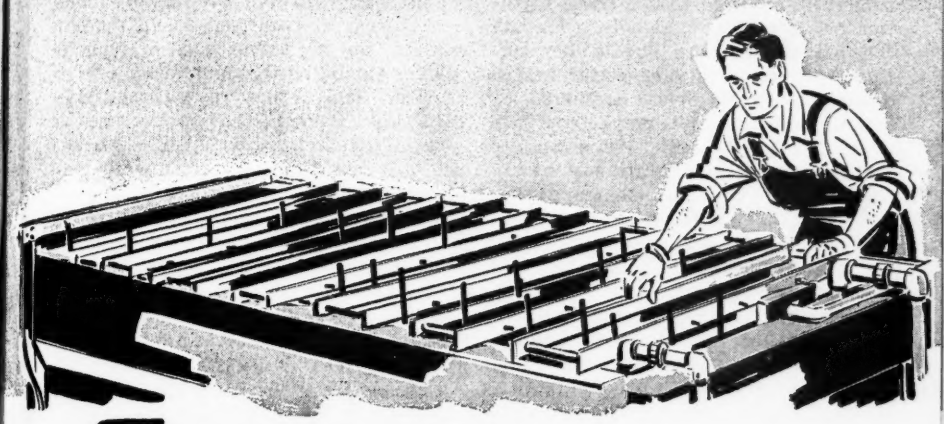
Inhalation or absorption through the skin of hydrocyanic acid gas may result in acute poisoning. The symptoms of acute poisoning by this highly toxic and rapidly acting gas are chiefly dizziness, vertigo, palpitation, intense difficulty in breathing and unconsciousness. Hydrocyanic gas is caused by the accidental mixing of cyanides and acids in the operations.

Preventive measures against these hazards range from an over-all plant program to the individual carefulness of each worker, and from an efficient ventilating system for all dangerous operations to keeping containers of poisonous supplies marked "Poison."

The floors of electroplatings rooms should be of smooth, water-tight material, such as plastic asphalt compounds, and should slope to a central drain so that any spilled liquids may be collected or neutralized before they pass into the sewer.

Adequate washing facilities including plenty of hot water, soap and towels should be provided near elec-

TO SAVE TIME, LABOR, METAL



-7 ANSWERS to your insulation and protective problems

☆ **UNICHROME "AIR DRY" RACK COATING**—a tough, easy-to-use rack insulation that saves frequent recoating — withstands hot alkaline cleaners, acid dips, hard chromium solutions and chromic or sulphuric anodizing baths.

☆ **UNICHROME "QUICK DRY" STOP-OFF 322**—a fast-drying, resistant lacquer that speeds preparation and handling—specially compounded for cyanide copper, chromium and other plating work requiring an extremely adherent stop-off.

☆ **UNICHROME "QUICK DRY" STOP-OFF 323**—a fast-drying, resistant lacquer that speeds preparation and handling—specially compounded for Parkerizing, chromium and other plating work requiring a stop-off that can be peeled off after use.

☆ **UNICHROME RESIST SHEET AND ROD**—a solid insulating material that is readily fabricated and extremely resistant to all plating room chemicals — specially suitable for constructing composite plating racks, stop-off shields, insulating gaskets and lattices for preventing short circuits in anodizing tanks.

☆ **UNICHROME STOP-OFF COMPOUND 311**—a solid, wax-like formulation that saves preparation time in stopping off complicated shapes — suitable for work requiring resistance to boiling hot cleaners, acid dips and high temperature plating solutions.

☆ **UNICHROME RESIST LACQUER BG**—a heavy-bodied, resilient insulating lacquer that has excellent all-round chemical resistance—specially suitable for hard chromium and Parkerizing work requiring a stop-off that can be peeled off after use.

☆ **UCILON**—an air-drying protective coating that is remarkably resistant to the action of both acids and alkalies, salts, cleaning compounds, oxidants and moisture—specially suitable for painting on ducts, equipment and other metal, wood, or concrete surfaces exposed to corrosion.

FOR FURTHER DETAILS or an initial order, write briefly stating your problem and the work for which the insulation is intended.

UNITED CHROMIUM
INCORPORATED
51 East 42nd St, New York, N.Y.
Waterbury, Conn. ☆ Detroit, Mich.

☆ *Trade-mark Reg. U. S. Pat. Off.*

troplating rooms, and employees should be required to use those facilities before eating and before leaving the plant. Workers should be cautioned to use plenty of water immediately to wash away any acid or caustic solution that may come into contact with the skin. It is well to remember that a fountain is a handy first-aid expedient for cleansing eyes that have been affected.

It is especially important that workers wear suitable safety clothing. For working with either acids or alkalis, the National Safety Council recommends natural or synthetic rubber boots, gloves, aprons and coats, and acid hoods or splash-proof goggles. Woolen shirts, trousers and underwear are more protective than cotton when working with acids. Cotton, on the other hand, is more resistant than wool to alkalis.

Here are other clothing tips for safest work with either acids or alkalis: A broad-brimmed felt or rubber hat protects the face, neck and ears against any possible dripping of chemicals from overhead. The collar should be kept closely buttoned; gloves should be tucked under sleeves; trouser legs should be worn outside the boots. These precautions are to prevent chemicals getting to the neck, the arms or the legs. And—very important—splash-proof goggles should be worn in all jobs where there is any chemical hazard to the eyes.

Workers should be taught to respect the hazards involved in bright dipping and vapor degreasing operations. Bright dip tanks and other acid cleaning operations should never be operated without good exhaust systems. Men should never be permitted to enter vapor degreasing tanks to clean them without airline respirators or hose masks, and a life line and attendant outside the tank.

The use of nitric acid for bright dipping, with its menace to health, perhaps life, by causing "nitrous

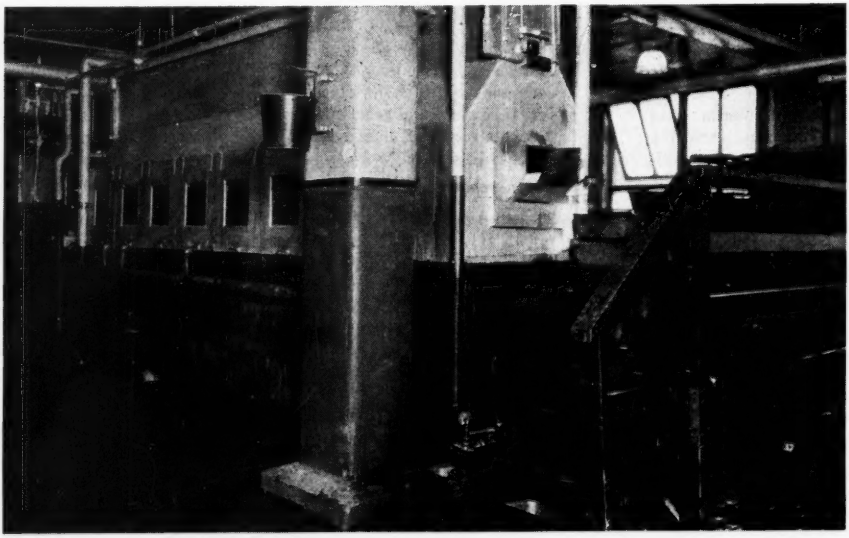
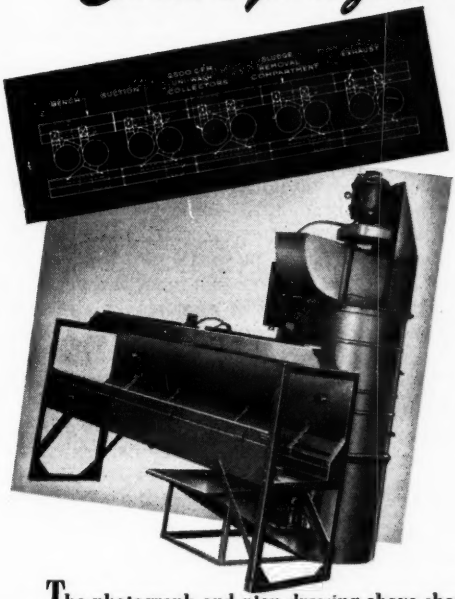


Fig. 2—Enclosure System to Confine Acid to Prevent Contamination of Air in Workroom

Conveyorized Grinding of PROPELLER BLADES using UNI-WASH Dust Collectors



The photograph and plan drawing above show one way in which the Newcomb-Detroit Uni-Wash Dust Collector can be easily adapted for specialized use. Well over a hundred of these units have been installed in the plant of a mid-western propeller manufacturer and more are constantly being added.

The set-up consists of a standard Uni-Wash Dust Collector attached to a booth. Inside the booth are fluorescent lights and two rails on which the fixture holding the propeller blade travels. The dust is drawn into the dust collector through a slot that runs the length of the booth.

Several of these units are placed end to end in a row and a man at each booth performs the proper grinding operation and then rolls the fixture down the line to the next man. Because of the large amount of metal removed from each blade, Uni-Wash's proved principle of dust removal is ideal for the job.

There are other reasons why Uni-Wash was chosen. Because there is a choice of inlet locations it was possible to build right and left hand units so that two rows could be placed back to back. Since the Uni-Wash itself takes up so little floor space this means a double saving. And the sludge can be cleaned out from the front of the benches.

Find out today where Uni-Wash can increase the efficiency of your production. Newcomb-Detroit engineers are always at your service.

NEWCOMB-DETROIT COMPANY

5753 RUSSELL STREET *Established 1912* DETROIT, MICHIGAN

Dust Collectors • Paint Spray Booths • Drying Ovens • Metal Parts Washers and Rust Proofing Systems • Exhaust and Ventilating Systems • Carburizing Systems • Other Sheet Metal Equipment

fume" poisoning, emphasizes the need for general mechanical and exhaust ventilation. As already pointed out, there are many other operations and substances which make adequate and correct ventilation essential to safest production.

Ventilation through cracks or even through open doors and windows is not adequate. In fact, such a draft may constitute an additional menace by blowing mists and vapors from a tank to the workmen. The correct ventilating system should furnish air from the outside through air heaters, then distribute the air through the place so that fumes will be carried toward tanks with exhaust ventilation.

These are chiefly measures of prevention. Naturally, first aid and medical care are important when a worker suffers from any injury or ailment. The skin affections, the most common hazard in the electroplating industry, are not usually so violent as to make first aid urgent, other than necessitating thorough washing immediately after the skin is contacted by an acid or caustic solution. A neutralizing agent should not be used except upon a physician's advice. The most important thing is to get medical care as soon as possible.

It should be borne in mind that treatment afterward is, at best, something like locking the barn door after the horse is out. Both for the good of the worker and for the benefit of our effort in the war of survival, a real program of prevention is essential.

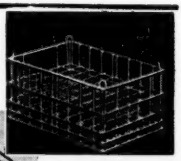
The foregoing points are by no means intended as a blanket safety plan for the metal finishing industry. It must be recognized that space does not permit a complete technical thesis on accident prevention. And general rules will not completely solve individual cases. This safety sketch is intended to point up the need for a systematic program and greater safety effort in every plant.

Whatever has been the practice and the record of any firm in the past, the manpower-and-production needs now add urgent impact to the long-term considerations of humanitarianism and commercial efficiency.

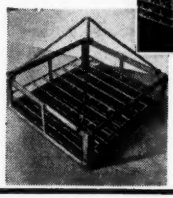
And let us keep this in mind: Constant safety-consciousness not only will "Save Manpower for Warpower," but also will contribute to the worker's own health welfare and that of others.

Hoods for Dust Collectors. Control of dust, fumes and odors in industry is covered in Bulletin 842 issued by the Claude B. Schneible Company, 3951 Lawrence Ave., Chicago, Ill. The bulletin treats of the abatement of these enemies of production, plant maintenance costs, worker health and finished product appearance through employment of the "Uni-Flo" Hood in connection with Schneible Multi-Wash Collectors. Copy free upon request.

BASKETS *and* CONTAINERS
of all kinds — for all purposes

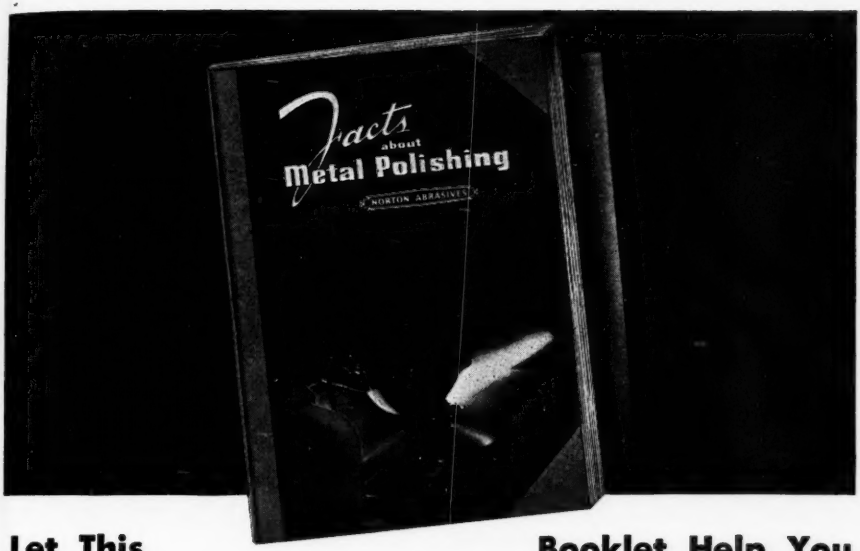


Regular manufacturers of baskets and containers for handling shells and all types of defense equipment.
Send us your basket problems.
Specialists in our work for over 40 years.
Write for folder.



AMERICAN Wire Form COMPANY INC.
271-275 Grant Ave. Jersey City, N. J.

QUICK SERVICE
•
QUALITY



Let This Booklet Help You
Get More Service from Your Polishing Abrasive

IT'S just what the name implies — "Facts about Metal Polishing," 39 pages of useful information. Typical chapter subjects are: Preparation of Glue, Types of Polishing Wheels, Setting Up Polishing Wheels, Setting Up Abrasive Belts, Correct Drying, Factors of Efficient Polishing.

Today, when it's absolutely necessary to get maximum service from your abrasive, this booklet is doubly valuable. Write for a copy today—no charge nor obligation. Just ask for Form 1340MP.

NORTON COMPANY, WORCESTER, MASS.

G-140

NORTON ABRASIVES

Finishing Facts

Armor-Vit—A New Finish for Metal

A COATING for metal products—which is said to be new and totally different—has recently been developed by the laboratories of the Chicago Vitreous Enamel Product Co., Cicero, Illinois. The new finish, or coating, called "Armor-Vit," is at once a material and a process. While the trade-name "Armor-Vit" suggests a material ceramic in nature, there is no relationship between this development and porcelain enamel and, being inorganic, no comparison with paint, lacquer, or the synthetic finishes.

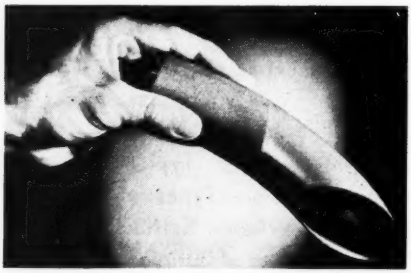


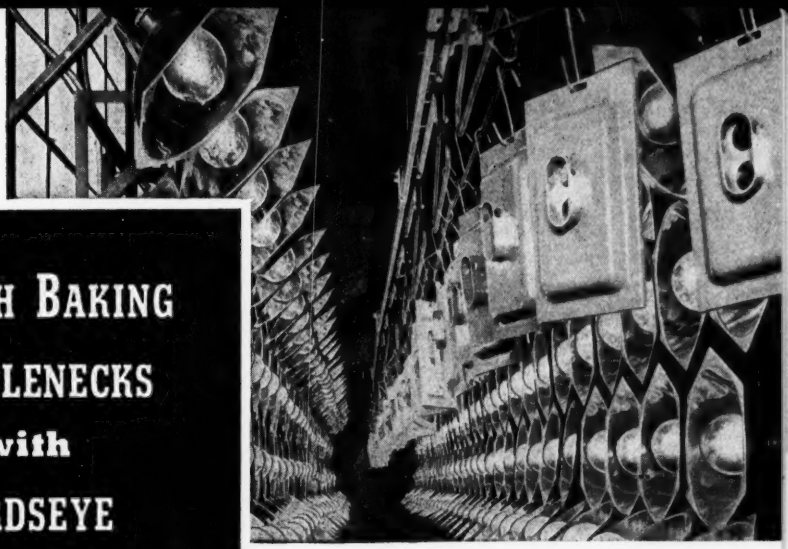
Fig. 1—A section of exhaust pipe, a portion of which was coated with Armor-Vit, is shown here. The section to the left bears no finish and became badly rusted when exposed to the weather for five months. The area coated with Armor-Vit was not affected.

Armor-Vit is essentially an alkali alumina silicate, one source of which is a new ingredient, an oil-bearing halloysite from the only known deposit in the world. Armor-Vit is applied in either one or two coats at 0.0005 to 0.0010 in. in thickness. Previous to its application, the metal is cleaned by ordinary cleaning methods—alkali cleaner, acid pickling and neutralizing. Sand blasting is usually recommended for cast iron.

Armor-Vit is said to be an exceptional rust or corrosion-resistant finish for metal products. By Chicago Vitreous laboratory experiments, field work and independent commercial laboratory tests, it has proved its ability to repeatedly withstand the standard 200-hour salt spray test, extended weatherometer tests, and all manner of acid and alkali tests with excellent results. Evidence of its ability to withstand corrosion is seen in Fig. 1, which shows a section of an exhaust, only a portion of which was Armor-Vitted. The section shown here is a piece which has been out in the weather for five months. The untreated end (under the fingers) is heavily rusted, whereas the coated end shows no evidence whatever of failure, there being no rusting back or flaking at the line of demarcation.

Impact and abrasion is said to be endured capably by this new finish, conclusive evidence being found in its application to steel skid-boxes used for transporting 37 mm. shot in an annealing plant (Fig. 2). After eight months of handling these rough shot, both cold and piping hot, the coating has capably withstood this severe test.

As for heat resistance or its ability



BANISH BAKING BOTTLENECKS with BIRDSEYE INFRA-RED

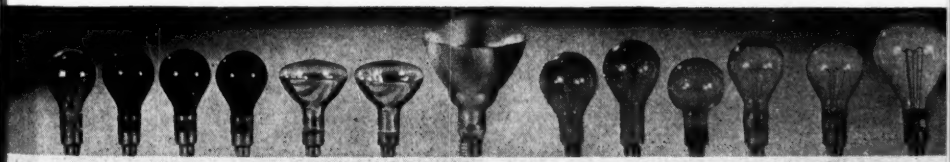
Save up to 95% in Finishing Time AND Get Better Bakes!

Industrial leaders from coast to coast now use Infra-Red for *better, faster, cheaper, easier* baking, drying, and dehydrating. Square-D (see photo above), Allis-Chalmers, Bulldog Electric, Curtiss-Wright, Dow Chemical and many others have adopted Birdseye Heat Lamps after exhaustive tests in use.

Instead of drying slowly inward from the surface, Birdseye infra-red rays penetrate deep down into lacquers, paints and enamels to start *instant baking from the inside out.* The results are sensational savings in time, as well as more uniform and lasting finishes.

Birdseye tungsten-filament Infra-Red Heat Lamps come in thirteen types and sizes. Economic 6000-hour average life. Write today for Booklet P-4.

BIRDSEYE INFRA-RED HEAT LAMPS



WABASH APPLIANCE CORPORATION

345 CARROLL STREET, BROOKLYN, N. Y.

Manufacturers of Wabash Photolamps and Superlite Light Conditioning Bulbs

Fig. 2—This Armor-Vitted corrugated steel skid box is used to transport 37 mm. armor-piercing shot. Although frequently the shot is extremely hot, the box has displayed resistance to scratching, abrasion, heat and wear.

to withstand thermal shock, Armor-Vit applied to ordinary steel test plates has been heated to 1,200 deg. F. and then quenched in cold water without failure of the coating. It is claimed that Armor-Vit effectively withstands such acids as acetic, sulfuric, nitric and hydrochloric and resists such chemicals as cold concentrated caustic soda, ethyl alcohol, toluene, ether, sodium chloride solution, calcium chloride solution, ammonium hydroxide and trisodium phosphate.

During the present emergency the coating is designed to meet the needs of such war items as field kitchens, gun mounts, marine hardware, helmets, tool and spare parts boxes, lighting equipment, and scores of other pieces of war material which must withstand rust and corrosion to a high degree.

Special Process for Removing Phenolic Lacquers

IN the manufacture of steel cartridge cases, the surface finish is an important part of the finished product. Special lacquers are necessary, performance specifications of which are embodied in Army Specification AXS-736 (Rev. 1). These lacquers are baked on and the final coating must be resistant to several organic solvents.

When, by chance, a lacquered case is rejected due to a defect in the lacquer caused by a scratch or through improper application, the complete removal of the lacquer becomes a problem. Many methods have been suggested using alkaline strippers. All of these, however, call for concentrated solutions which require considerable time to strip. In certain methods the removal of lacquer is not complete, particularly on the inside, and the steel case must be scrubbed by hand to remove the lacquer completely.

One manufacturer has, however, de-

THOSE PERFECT PARTNERS FOR PICKLING
NEP and SUMFOAM
TO CONTROL ACID AND FUMES IN THE PICKLING DEPT. SAVE ACID, METAL AND WORRY. ELIMINATE FUMES AND HEADACHES.
THE WM. M. PARKIN CO. • Highland Building, Pittsburgh, Pa.

FOR BETTER
CYANIDE ZINC
BRIGHT ZINC
AND LEAD

Plating

VITAL TO INDUSTRY

Cyanide Zinc Plating, Bright Zinc Plating and Lead Plating are replacing cadmium for many operations. For any of these, a chemically clean surface is absolutely essential. TURCO has therefore developed two Specialized Chemical Compounds which will insure perfect surface preparation for these operations.

TURCO PENETROL is a potent liquid cleaning Compound which removes all forms of soil by simple cold immersion. Removes paints and lacquers; will not attack metals; cleans by penetration and wetting out; no special equipment required.

TURCO POROKLEEN is the perfect material for final cleaning before plating. It produces a chemically clean surface quickly and efficiently by a wetting out process which leaves no waste or film. Free rinsing; cleans pores of the metal.

Write for complete information on approved methods of operation for the three processes, with directions for precleaning and final cleaning. Send name, address, title and firm to . . .

TURCO PRODUCTS, INC.

54-43

LOS ANGELES • SAN FRANCISCO • CHICAGO
HEAD OFFICE: 6135 So. Central Ave., Los Angeles
Sales and Service Representatives and Warehouse Stocks in All Principal Cities

veloped a method for lacquer removal which is said to be free from the usual difficulties. It employs a low concentration alkali operating at or near the boiling point. The cases are dipped in this for a short time. The cases are then rinsed and dipped in a non-proprietary solution which removes the last traces of lacquer and furnishes rust protection until the parts can be reprocessed.

All types of phenolic lacquers meeting Specification AXS-736 are removed with equal ease. The life of the solutions involved is comparatively long and no harm can result if parts being stripped are allowed to remain in the solution for extended periods of time.

No critical materials are involved in the stripping solutions and ordinary steel tanks with heating coils are the only equipment necessary. For more complete details, a process sheet giving all the necessary information is available from MacDermid, Inc., Waterbury, Connecticut.

New Methods Reduce Blackout Hazards

NEW developments plus experience gained during the past year are helping reduce the hazards of blackouts and dimouts and are making these protective measures more effective, according to statements recently made by Samuel G. Hibben, noted lighting authority. Mr. Hibben, who is director of applied lighting at the Westinghouse Lamp Division, Bloomfield, N. J., predicted a greater reduction in the accident toll during blackouts and dimouts once full advantage is taken of modern lighting and safety devices.

"One of the most interesting developments in blackout technique has been that of phosphorescent and fluorescent materials," Mr. Hibben pointed out. "Phosphorescent coatings will glow in the dark without light being shined upon them, while fluorescent materials glow when irradiated by ultraviolet light which itself is invisible.

Recommending the use of luminous markers and signs to denote exits, doors and factory aisles, Mr. Hibben also described its use on clothing and automobile exteriors. In addition, he added, phosphorescent coatings may be used to outline door knobs, switches, stairs, railings, paths to air raid shelters, and in many other locations.

"Blackout accidents are not necessary," he said. "Early in this war, thousands of persons in Great Britain were injured because of blackout accidents in the homes and streets. We want to prevent that from happening here as much as possible—whether or not bombs fall."

New Mixing Formulas for Lead Paints

NEW mixing formulas for red, white and blue lead paints to be made up on the job, the use of which will save up to 50 per cent of the normal linseed oil requirement, were recommended recently by the Specifications Branch of the Conservation

BETTER PLATING, LESS COST!
"MGC" ELECTROPLATING EQUIPMENT
Write for Interesting Details TODAY!
MOTOR GENERATOR CORP., HOBART SQ. BOX PF43 TROY, OHIO

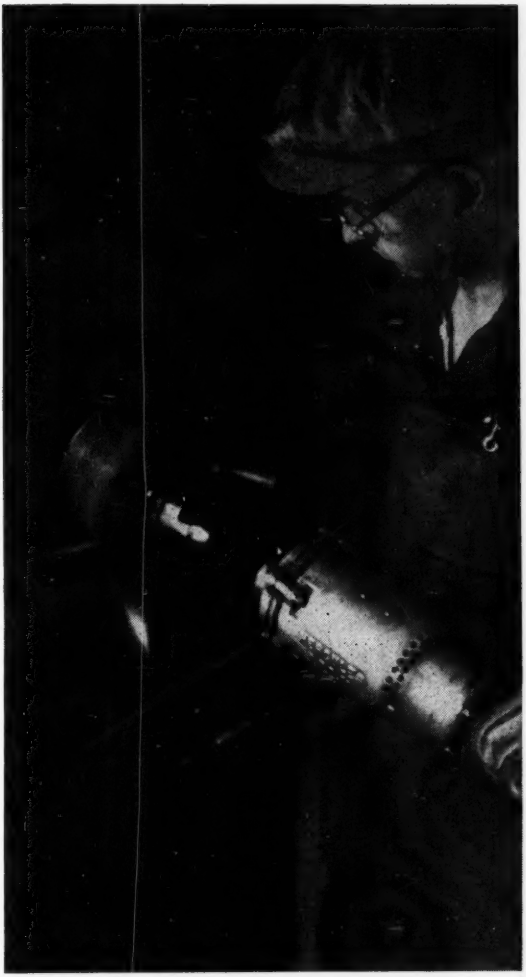
Does your Polishing Room know who's

BOSS?

● Your Polishing Room has a new boss now—Uncle Sam! What he asks of your employees is more than just a full day's work. He also wants them to conserve tools and materials.

So make sure your polishing wheels are properly prepared and correctly used. You can increase their efficiency by your choice of grain and glue . . . by the method of applying and curing . . . by seeing to it that each wheel is correctly mounted and operated at the proper speed.

For further information write for the "Aloxite-TP" Manual of Polishing Practice.



CARBORUNDUM
ABRASIVE PRODUCTS

THE CARBORUNDUM COMPANY
REG. U. S. PAT. OFF
Niagara Falls, N. Y.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Aloxite are registered trade-marks of and indicate manufacture by The Carborundum Company)

Division, War Production Board.

The limited imports of castor nut, babassu nut and oiticica oil from South America; stoppage of imports of tung oil from China, coconut oil from the Philippines, and palm oil from Africa; and lend-lease exports of edible oils have all contributed to the overall shortage of fats and oils. Since oils are to a large extent interchangeable, increasing demands made on the limited supply of linseed oil, produced from flax grown in the Middle West, called for conservation measures.

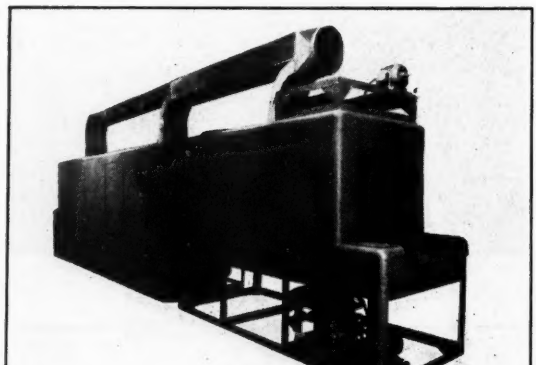
Prepared by the National Bureau of Standards, the new formulas provide for substantial savings of linseed oil with no detrimental effect to the paint. Reduction of linseed oil content merely increases the pigment volume ratio.

In recent years new fast-drying finishes containing alkyd and phenolic resins have been developed. The Armed Services made heavy demands for these finishes to be used in coating shells, trucks, tanks, airplanes and ships. Increased demand and limited supply of this type of finish necessitated allocation control of phenolic resins established under Conservation Order M-246, issued November 4, 1942, and Conservation Order M-254, issued October 26, 1942. Conservation Order M-139, allocating control of alkyd resins, was issued December 7, 1942.

Because of these allocation controls, synthetic resins for use in the production of metal primer paints are not available for civilian use. However, the older type of finish (linseed oil) is said to be more than adequate for non-combat use.

Your Life Insurance won't be worth a nickel if we lose this war. Buy Freedom Insurance, too — Victory Bonds!

CLEAN AIRCRAFT PARTS...



Clean aircraft parts are essential to the precision manufacture of fighters, bombers, et cetera for the American armed forces. The compact and efficient wash and rinse unit shown is ideal for washing intricate motor propellor hub parts as well as many other similar parts. The parts revolve before high pressure sprays which clean every surface and recess quickly and thoroughly.

Other types of metal cleaning and finishing machines for all types of processing will be gladly explained by Howard sales engineers who are at your service.

Write to:

HOWARD ENGINEERING & MFG. CO.

1056 HULBERT **CINCINNATI, OHIO**

ILLUSTRATED CATALOG ON REQUEST

Like Bombs on the Axis-

GOVERNMENT SPECIFICATION FINISHES by PERMITE

Help Speed Victory!

Quick Drying Camouflage Enamel

Quick Drying Metal Primer

Ammunition Lacquer Enamel

Spar Water Resisting Varnish

Aluminum Mixing Varnish

General Purpose Lacquer Enamels

Dope, Cellulose Acetate, Clear

Paints for Ammunition

Paint, Cavity—for Torpedoes

THE long experience of Permite chemists in developing exclusive varnishes and vehicles for Permite Ready-Mixed Aluminum Paints, and the complete facilities of the modern Permite paint plant enable us to supply prime contractors or sub-contractors with government specification finishes for practically all types of equipment or ammunition finishes.

Clear and colored lacquers, zinc chromate primers, enamels, mixing varnishes, camouflage paints, rust inhibitors – custom-built to Government Specifications – are included in the Permite Line. We also supply Permite Aluminum Paints on WPB allocation.

Quotations on your finishing needs submitted promptly upon request.

ALUMINUM INDUSTRIES, Inc.
CINCINNATI, OHIO

PERMITE *Industrial* ***FINISHES***

News OF THE INDUSTRY

Second Oakite War Production Conferences

Due to the necessity of interchanging information directly concerned with facilitating and speeding-up production of ordnance matériel and other essential war supplies, the Second War Production Conferences of Oakite Products, Inc., 20 Thames St., New York, N. Y., were held concurrently last month in New York, Chicago, Detroit and Memphis.

Highlighting the two-day programs of each Division Conference was a review of technical data dealing with currently used time and manpower saving techniques for handling such war production operations as pickling, degreasing and preventing rust on steel shells; cleaning gun carriages, mounts and turrets; cleaning tools, dies, gun and torpedo parts before electroplating; cleaning before black oxide finishing, Parkerizing, Bonderizing, Bullard-Dunn Process and other special surface treatment processes; preparation of aluminum and magnesium before anodizing, Dow No. 7 treatment, Alroking, painting and similar operations. In addition, use of Oakite materials in machining, grinding, drawing, stamping, burnishing and tumbling was discussed at considerable length.

Supplementing these sessions were others devoted to discussions directly bearing on equipment maintenance and plant sanitation problems in food canning and meat packing plants, shipyards, textile mills and railroad shops.

According to J. A. Carter, Assistant to the President, the conferences gave added and convincing evidence of the vital importance of degreasing and related operations in accelerating production of essential war supplies. While no formal papers were presented, the information and data exchanged at the conference will be freely available through the Oakite Field Service Staff to all concerns engaged in war work and essential civilian industries.

Atlas Powder Creates New Department

Leland Lyon, president of Atlas Powder Company, Wilmington, Del., announced recently that the executive committee has created a new department in the company to be known as the advertising and public relations depart-

John Swenehart

PX

FOR BLACKENING

STAINLESS STEEL
STAINLESS IRON
CAST & MALLEABLE
IRONS

Here is a completely new method of producing a real uniform black on special irons and steels. It is both rapid and inexpensive. Use it on your ordnance work.

Details on request

HEATBATH CORPORATION SPRINGFIELD MASSACHUSETTS

ment. John Swenehart, heretofore manager of the advertising department, has been appointed director of the new department. F. J. Horty has been appointed director of industrial relations and service.

Change in Name of Detroit Firm

Industrial Sheet Metal Works, Detroit, Mich., has announced that its name has been changed to Industrial Equipment Corporation. Established in 1929, the company today occupies an important position among manufacturers of dust collecting and spray booth equipment, as well as ovens and ventilating systems.

The company will continue to operate under the same management at the same address—628 E. Forest Ave., Detroit, Michigan.

Philadelphia Quartz Promotes LeRoy R. Fischer

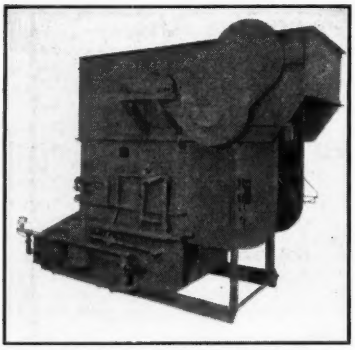
Philadelphia Quartz Company, Philadelphia, Pa., has announced the appointment of LeRoy R. Fischer as assistant sales manager of detergents. Mr. Fischer, a graduate of the chemistry course of the University of Wisconsin, joined the sales staff of the company in 1934, operating from the Chicago sales office. In 1935 he was transferred to the headquarters office in Philadelphia.

LeRoy R. Fischer

A. E. S. Milwaukee Branch Annual Educational Meeting

The Milwaukee Branch of the American Electro-Platers Society will hold its Annual Educational Meeting and Banquet on Saturday, April 24, 1943, at the Schroeder Hotel in Milwaukee. All members and other persons interested in

TAKE THE SLOW SIGN OFF YOUR PRODUCTION LINE



Illustrated is an automatic degreaser for 20, 37 and 40 MM projectiles and fuse parts.

Costly time consuming hand operations can be eliminated in your production work by the use of the overhead monorail type conveyor and Blakeslee Metal Parts Washing Equipment. You can take the SLOW sign off your production line and speed up machining and finishing operations by quickly and thoroughly cleaning stampings, castings, metal assemblies and all screw machine products with Blakeslee engineered-for-you equipment. Write today for full details on Blakeslee's Metal Parts Washing Machines and Solvent Degreasing Equipment. *Write or wire for rush quotations on any war defense contract requirements.*

G. S. BLAKESLEE & CO.

NEW YORK • CHICAGO • TORONTO, ONT.

As clear wood lacquer
becomes increasingly
scarce

Type C *NON-LIMITATION*
Clear Finish
Becomes Increasingly
More Important
Investigate!

•

Phone, wire or write

RANDOLPH
FINISHING PRODUCTS CO.

Carlstadt **New Jersey**

electroplating are cordially invited to attend.

The Educational Session (for which no admission charge will be made) will be held in the Pere Marquette Room at 2:00 P. M. An interesting and informative program has been arranged, and the speakers and their topics are as follows:

Mr. B. F. Lewis—"Micrographic Studies of Surface Preparations"

Mr. Walter Pinner—"The Electrical Circuit and Power Saving in the Plating Circuit"

Mr. G. Soderberg—"The Chromate Treatment of Zinc Plated Surfaces"

Dr. Edwin Baker—"Chrome Plating"

The Crystal Ball Room will be the scene of the banquet at 7:00 P. M. Special music and entertainment have been arranged.

SOL-KLEAN
for
Better Paint Adhesion
INDUSTRIAL CHEMICAL PRODUCTS CO.
DETROIT
Milwaukee **Fort Wayne**

Two Central Region Offices Opened by Detroit Rex

W. W. Davidson, vice-president and general sales manager of Detroit Rex Products Company, manufacturer of Detrex solvent degreasers and metal washing equipment, recently announced the establishment of two new offices. The north central region, which includes the entire state of Michigan except the upper peninsula, is served from headquarters in Detroit. R. W. Pflug, who is in charge, also supervises the handling of large national accounts whose home offices, including purchasing and control, are in Detroit.

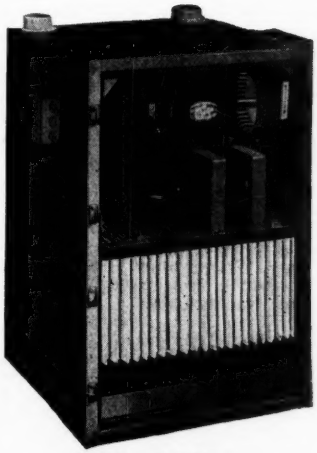
W. F. Newbery is manager of the south central region which comprises the states of Ohio, Indiana, and Kentucky. Offices for this territory were recently established in the Mutual Home Bldg., Dayton, Ohio.

Testing finishes simplified by Taber ABRASER

Comparative tests for adhesion, wearability and toughness of paint, lacquer, enamel, electroplate and similar finishes are accurately made from four-inch specimens. Results totalled on built-in counter in terms of wear cycles. *Write for Bulletin 2014.*

TABER INSTRUMENT CORP.
111 PF GOUNDRY ST., NORTH TONAWANDA, N. Y.
Designers and Builders of Precision and Scientific Apparatus

TORIT DUST COLLECTORS



Interior of Cabinet

PROTECTION FOR MEN AND MACHINES

Production will win this war and must not be retarded by "machine breakdowns" or lost man-hours caused by *dust*.

A Torit Self-contained Dust Collector, standing "watch" on your production line, is your assurance against this menace.

Torits are portable, self-contained units, are economical to operate, simple to install, wherever grinding, buffing and cut-off machines are operated.

WRITE TODAY FOR DETAILED INFORMATION.

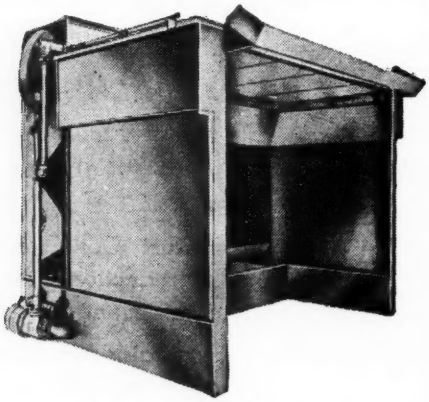
TORIT MANUFACTURING CO.

314 WALNUT STREET
ST. PAUL, MINNESOTA

New PLANT EQUIPMENT AND Materials

Aqua-Restor Paint Spray Booth

The illustration shows the Type FLRS-7 standardized floor-type Aqua-Restor Paint Spray Booth, featuring rear and side water-impingement walls. The unit employs the Aqua-Restor superturbulent chamber. Developed to meet high-speed, high-standard war production spraying requirements, the booth is said to offer maximum painting speed with increased safeguards for the workers; fire hazards are also reduced.



Aqua-Restor Type FLRS-7 Paint Spray Booth

In operation, the side and rear walls of the Aqua-Restor Paint Spray Booth are continuously covered with a sheet of water which is completely controlled; workers and articles being painted are never showered in Aqua-Restor booths. Because the Aqua-Restor method of air cleaning requires no spray nozzles or moving parts, work stoppages for servicing are reduced to a minimum; additional economies are effected through low horsepower pumping needs. High reclamation averages are reported for all types of pigments.

The standard Type FLRS-7 is available in all sizes, equipped for fluorescent lighting. Other types are engineered by Aqua-Restor Division, Mayer Manufacturing Corp., 39 Division Place, Brooklyn, New York, to meet specific production requirements.

Industrial Decade Resistance Box and Wheatstone Bridge

Because of the heavy and urgent demand for standard laboratory equipment of the Wheatstone Bridge and Decade Resistance Box categories, Industrial Instruments, Inc., 156 Culver Ave., Jersey City, N. J., has announced its line of such instruments.

Type DR d.c. Resistance Decades are available in standard models with resistance ranges of 0.9 to 999,999 ohms total and with accuracy of plus/minus 1 per cent and 0.1 per cent respectively in two price classes. All coils are of manganin wire excepting the 100,000 ohm coils of Nichrome. All coils are bifilar-wound on ceramic tubes, oven-baked and protectively coated. Switches have self-cleaning multi-blade phosphor-bronze spring wipers. The instruments are housed in rubbed walnut cases.

Wheatstone Bridge Type RN-1 con-

Put it on your calendar *now* . . . let *nothing* pull you away...the 31st A.E.S. Annual Convention! New developments...*new* processes...the impact of war—*and post-war trends*—on plating! Discuss your own pressing problems with recognized authorities! Extend the vital trade contacts that were never so difficult to maintain! Pack *all* this into 3 exciting days . . . at

American Electroplaters' Society

31st ANNUAL CONVENTION

BUFFALO, N. Y. • HOTEL STATLER

June 7, 8, 9, 1943

PROGRAM

MONDAY
Organic Finishing
5 papers planned

•

TUES. A.M.
Burring
4 papers planned

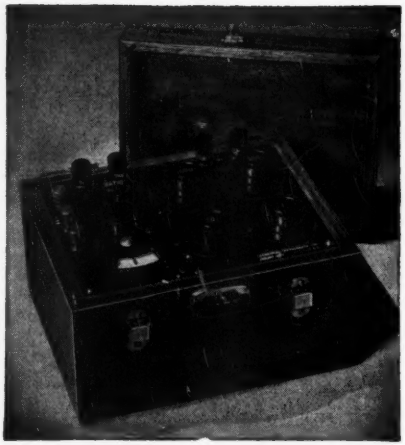
TUES. P.M.
Hard Chromium
4 papers planned

•

WED. P.M.
Plating
5 papers planned

WED. A.M.
Cleaning
4 papers planned

Tin, Silver, Black, Magnesium, Anodizing



Industrial Decade Resistance Box
Industrial Wheatstone Bridge

tains four resistance dials with nine positions each, covering 9 by 1, 9 by 10, 9 by 100, and 9 by 1,000 ohms, with decade multiplying dials. The ratio resistances have an accuracy of plus/minus .05 per cent, while the resistance coils in the decades of the bridge are said to be guaranteed to plus/minus 0.1 per cent tolerance. Specifications for switches and cabinet are the same as for the decade boxes already described. The galvanometer is of the well-proven moving-coil type with sensitivity of one microampere per division. Three standard flashlight cells comprise the 4½ volt battery in the cabinet, readily accessible without removing the panel. Also, external battery connections are provided.

Turco Plexi-Glyst

Turco Plexi-Glyst, an industrial compound created to safeguard visibility of plastic glass used on warplanes, recently was announced by Turco Products, Inc., 6135 S. Central Ave., Los Angeles, Calif. Turco Plexi-Glyst is said to be approved by the manufacturers of Plexiglas for the safe cleaning of their product. It emulsifies grease and engine spatter and cleans all plastic glass in locations

BUCKINGHAM COMPOUNDS

NOW USED IN

WAR PRODUCTION

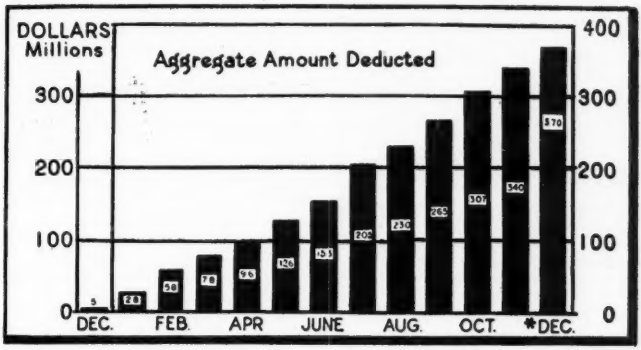
BURRING • GREASELESS
HARDENED STEEL COMPOSITION

Samples Shipped Promptly

The Buckingham Products Co.

8900 HUBBELL AVENUE DETROIT, MICHIGAN

Tomorrow's SALES CURVES ARE BEING PLOTTED Today!



*Approximate

THIS CHART SHOWS ESTIMATED PARTICIPATION IN PAYROLL SAVINGS PLANS FOR WAR SAVINGS BONDS

(Members of Armed Forces included, starting August 1942)

There is more to this chart than meets the eye. Not seen, but clearly projected into the future, is the sales curve of tomorrow. Think what $4½ BILLION per year in War Bonds, saved through the Payroll Savings Plan, will buy in the way of *brand new consumer goods tomorrow.*

Here indeed is a solid foundation for the peacetime business that will follow Victory. But there is still more to be done. As our armed forces continue to press the attack in all quarters of the globe, as war costs mount, so must the record of our savings keep pace.

Clearly, on charts like this, tomorrow's Victory—*and tomorrow's sales curves*—are being plotted today.

EVERYBODY EVERY PAYDAY AT LEAST 10%

Save with

War Savings Bonds

This space is a contribution to America's all-out war effort by

PRODUCTS FINISHING

where clarity is essential, such as on bomber noses and windshields, sighting apertures, housings on navigation instruments, gas masks, goggle frames and lenses for tank drivers and welders.

It is claimed that Turco Plexi-Glyst is non-toxic and is safe for use on paint and hands. It is free-rinsing and leaves the plastic surface clear and free from greasy film which might collect dust. Plastic glasses, easily abraded by grit or sand particles, must be clarified by a specialized cleaner. Plexi-Glyst does not cause "crazing" of stressed surfaces or infinitesimal scratches resulting in blurred images. Plexi-Glyst is easy to apply by sponge, spray or with the bare hands. It it is non-inflammable and is miscible with water.

USE

McKeon's "Liquid Sulphur"

FOR COPPER STRIPPING

1. Remove grease from work. 2. Immerse in 12-20% of McKeon's "LIQUID SURPHUR." 3. Rinse. 4. Immerse in 20% (about) Sodium Cyanide. 5. Rinse.

Ask for FREE sample.

SULPHUR PRODUCTS CO.

GREENSBURG • PA.

"Filtrablend S"

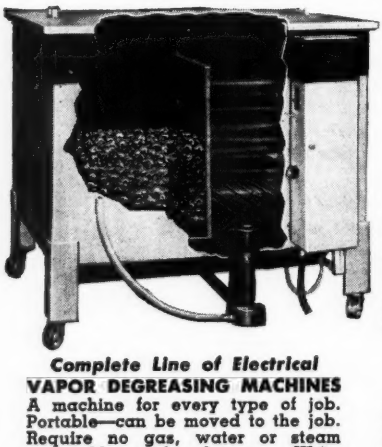
A soluble oil base designated as "Filtrablend S" has been placed on the market by Petroleum Specialties, Inc., 570 Lexington Ave., New York, N. Y. The outstanding feature of Filtrablend S is the fact that it contains no scarce ingredients and is therefore available without priorities. It can be blended with most neutral oils in a ratio of one to six. Aqueous emulsions made from Filtrablend S are said to be stable, nonfoaming and meet Army and Navy specifications.

Jones Abrasive Belt Backstand Idler No. 120

An abrasive belt backstand idler—designated as the No. 120—has been developed by the Jones Engineering Company,

NEW Improved

Vapor Degreasing



Speeds Up Vapor Degreasing by More Than 33⅓ % -- Safer, More Economical

Developed by Phillips, PHILLSOLV vapor degreasing solvent is tops for efficiency. It cuts vapor degreasing time by one third! Reduces vapor loss. Handles wider range of greases. Gives more thorough penetration of close, nested parts of ferrous and non-ferrous metals. Low toxicity—higher safety factor.

Complete Line of Electrical
VAPOR DEGREASING MACHINES
A machine for every type of job. Portable—can be moved to the job. Require no gas, water or steam lines. Many other features. Write for catalog.

Write for FREE Degreasing Manual!
PHILLSOLV, non-water soluble, has many applications in instrument and war plants. No corrosive action. Write today for FREE manual on Vapor Degreasing telling how to use this new process. Also for catalog of Phillips Electrical Vapor Degreasing machines.

PHILLIPS Manufacturing Company • 3482 W. Touhy Ave., CHICAGO, ILLINOIS

-for Fast-Finishing

"INDIAN BRAND" POLISHING ABRASIVE

For nearly forty years we have been producers and refiners of abrasive grains, serving the industry with a strictly quality product for all particular abrasive applications. Accurately Graded — Thoroughly Cleaned — Greater Capillarity — Longer Wear.

Send for trial lot—FREE!

Indian Brand Polishing Abrasive
Hecco Brand American Emery

THE HAMILTON EMERY & CORUNDUM CO.

Chester, Massachusetts

GET WORK OUT FASTER

with

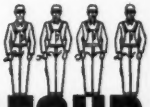
Steel-Grip Gloves

With no time to be lost, keep war production moving, speed deliveries, save time with Steel-Grip Reinforced Gloves. They handle rough, heavy, jagged materials at breathless pace. Chrome tanned cowhide. Steel ribbon reinforced palm and fingers. Steel thread sewed. Protect against cuts, bruises. Or what's your need? Over 4300 proved Steel-Grip Safeguards may give immediate answer. Used by big industrials since 1910. Write for catalog or state your need *today*.

INDUSTRIAL GLOVES CO.

746 Garfield Blvd. Danville, Illinois

(In Canada: Safety Supply Co., Toronto)



SAVING THREE MEN OUT OF FOUR

MAGNUS MATERIALS, METHODS AND MACHINES FOR METAL TREATMENT

With a Magnus Machine in your production line using the right materials for precleaning, washing, pickling, bonderizing or any other metal finishing operation . . . you can save three men out of four, compared with manual methods.

More—the work can be done with women where manual operations demand the strength of men.

MAGNUS methods and machines are designed to meet your particular problems. They speed production and solve the manpower shortage as it affects metal finishing processes. Best of all, you won't have to wait months for your Magnus machine.

Ask for YOUR copy of "The Metal Cleaning Handbook"... the most complete treatise on metal finishing operations ever published.

MAGNUS CHEMICAL COMPANY

Manufacturers of Industrial Cleaning Materials—Washing, Drying, Pickling Equipment—Metal Drawing Lubricants. Also Methods Engineering Service.

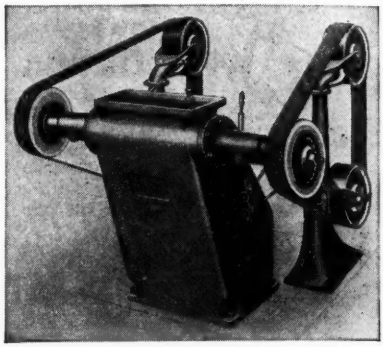
208 SOUTH AVENUE GARWOOD, N. J.

Service Representatives In All Principal Cities

Magnus CLEANERS

Ellwood City, Pa. The unit, a floor-type model especially designed for crowded grinding and polishing departments, can quickly and easily be connected to any regular grinding or polishing lathe.

The Jones Model 120 takes a minimum of floor space due to a unique vertical arrangement of pulleys. Conversion of regular lathes to belt grinding by means of this unit is said to result in fast, easy and uniform grinding.



Jones Abrasive Belt Backstand Idler No. 120

Other features of the Jones Abrasive Belt Backstand Idler No. 120 include conveniently located controls at the front of the machine, handy to the operator, and positive screw belt tightening. The backstand will take any belt size up to 6 in. wide, is designed for belt speeds up to 10,000 s.f.m., and is so built that simple dust-collecting hoods can easily be installed.

SPECIFICATIONS!

+

PLUS

Adaptation of formulae to the individual requirements of busy war contractors.

Within specification limits there are many possibilities of improvement in speed, workability, and freedom from rejects.

This PLUS factor is worth considering. We'd like to tell you more about it.

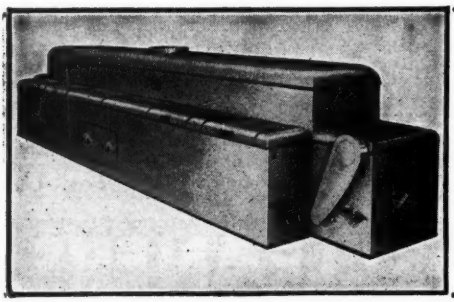
The Varnish Products Co.
Cleveland, Ohio

For a real good polishing job use

KEYSTONE EMERY

TURKISH — NAXOS — AMERICAN

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.



HYDRO-FLOW
Industrial Washing Machines

Streamlined design. Hidden motors, pumps and pipes are easily accessible. Piping and nozzles located to insure thorough cleansing of all surfaces. Rugged and efficient pressure pump. Corrosion resistant spray nozzles—from mist to open stream. Monorail, Belt or Gravity type conveyors designed to carry any shape or size material. Variable speeds on conveyor drive synchronize production.

International Conveyor & Washer Corp.
Write for circular.
640 E. FORT ST. DETROIT, MICH.